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Iron Ores and the Iron Manufacture of the United States.

Continued from page 577.

NEW YORK

The furnace No. 2, or the lower furnace, was built nine years since, its first blast commencing in July 1841. It stands on the dock very conveniently situated for receiving and for the shipment of material. The height of the stack is 40 feet. The boshes have been 11 feet and afterwards 10½ feet across; the tunnel head 40 inches, and then 42 inches. The blowing apparatus is two cast iron cylinders, one 5 feet diameter and 5 feet stroke, the other 3 feet 9 inches diameter and 5 feet stroke—they are run about five revolutions per minute, with about the same pressure of blast as in the other furnace. The heating pipes, either 24 or 28 beside the bed pieces, are of smaller size, though similar shape, to those belonging to the other furnace; and like them they are arranged in two sets. They are eight feet high and stand only two inches apart on the bed pieces, being kept at this distance by a small cross an inch thick cast on each side of each leg a little more than half way up. Two crosses on opposite legs touch each other, and so keep the legs just two inches apart, as in the sockets at their base.

This furnace, having been longer built, is not in so good order as the other; its last blast was from 1st January 1847 to 23rd May 1848; and it now requires re-lining and other repairs. The stack itself will require to be rebuilt before it has run many more years—with this exception, and the repairs to the dam above referred to, which cannot cost more than $1500, and the addition of a few coal houses and sheds, no establishment would be better provided than this with every thing required for the manufacture of iron on a large scale. Many things, indeed are found here, which are not often met with at such works; as, for instance a complete machine shop, in which is a turning lathe, the cost of which was about $400; and also a very large collection of patterns for castings of various kinds. There are also eight good kilns for charring wood, built on the dock near the lower furnace.

The tables inserted with this article are interesting as giving the exact workings of the furnaces for several years, and showing therefore what may be expected of them in future. They are of interest also for representing the improvement in the productiveness of the furnaces from about the close of the year 1844. At this time C. C. Alger, Esq., of Stockbridge took them on contract, and Mr. Tower, now part owner and manager of the Crown Point furnace was employed by him to run them. The changes introduced were—*first*, an increase of blast, a notice of which does not appear in the Journal of the furnaces. It was, however, so considerable, as I am informed by Francis H. Jackson, Esq., the then agent of the company, that the flame from the tunnel head, never before at all remarkable, was all at once raised in great volumes far above the chimney, lighting up the village at night, and causing some alarm for the safety of the works. And *secondly*, the use for flux, in addition to the limestone, of a mixture of calcareous clay or marl and fine ore ground together *wet*, making what was called a *grout*. This process having proved very successful, a patent was taken out for it, by Mr. Tower; and the right to use it has been purchased of him for other furnaces. Mr. Alger, and several others too, do not concede the discovery to him, considering their own claims equally good. The right, however, has never been legally contested. Mr. Tower writes me, he was led to try the experiment from the peculiar manner of working of wet and dry earthy bog ores at two furnaces he had charge of at Arcoll Ohio, in 1832 or 1833—the ores when dry seeming to choke the furnace, and make it work irregularly, while when charged in a wet state, of the consistency of moulder's sand, the furnace worked evenly, and made a clean cinder and good iron.* The beneficial effect of the grout is perhaps not to be ascribed so much to its being put into the furnace wet, as to the thorough agglutination of the particles of ore and flux caused by their being well mixed and ground together in this state. Mr. Tower's account of the workings of the furnaces before and after the use of the grout is interesting, and may be of service to others. He remarks—"when I first come to Port Henry I found one of the furnaces in blast making about four tons of iron per day, which was thought a good yield. The iron seemed to run well into the pig bed, and I noticed that its appearance was very much like the Arcoll iron—when the furnace was in good order, the iron soft and running well. But I had been there only a day or two before I discovered one of those floods of black scouring cinder run out; and I looked for the furnace to run cold, at least until a change of stock should take place. But to my astonishment in an hour or so the furnace was running a good cinder and working hot."

To correct this irregularity a marly clay found by Mr. Tower, was mixed in with the fine ore wet, and worked, according to the furnace Journal, in June 1844. Mr. Hayes, now of Boston, who analysed this with other fluxes and ores and reported in October of the same year, speaks of it as a flux better adapted than most others for the working of rich iron ore.

"The result of the grout" (I quote from Mr. Tower's account) "is, that nearly double the quantity of iron is now made at the same furnaces that there was before that discovery was put in practise, the quality of the iron is proportionally improved, and a great saving of fuel and ore is made."

Whether all this can be ascribed to the grout alone, I am by no means so confident; nor do I think the furnace Journal fully sustains this view; but of this each one can judge for himself by its examination—bearing in mind that the quantity of air blown in was, as Mr. Jackson informs me, at least doubled at the same time. That the use of a light open flux for rich ores of the solidity of these magnetic ores, which with hard dry stony fluxes tend to clog and derange the furnace is beneficial, there can be no question—neither as to the excellent effect of grind-

* A similar use of *wet* ores, it will be seen by reference to page 291 of this vol. of the Journal, was adopted at the Tuscany Furnaces.

Port Henry Furnace, No. 1.

DATE. 1840.	FUEL USED. Coal. bush.	Brands. bushels.	Wood cords.	ORES USED. Cheever.	Sanford.	Hall.	W. Hall.	E. & Green.	Daliba.	Hematite.	Monkton	Washed.	FLUXES. Limestone.	Cinder.	Clay	PIG IRON MADE. No. 1.	No. 2.	No. 3.	Plate and scrap.	Whole amount.
Blast No. 1.				T. cwt q. lb.																
July	14,746	.....	70 4-5	108 13 0 24	32 2 3 10	25 5 2 26	19 17 0 22	.....	.....	.....	.....	.....	20 0	....	.....	52 18 1 16	43 0 0 20	9 0 0 0	4 5 3 8	109 4 1 16
August	19,194	1,198	.....	153 3 0 12	28 11 0 15	37 19 2 11	11 4 3 0	.....	.....	.....	.....	.....	19 3	....	.....	47 0 0 0	71 0 0 0	24 0 0 0	1 12 0 16	143 12 0 16
September	18,657	1,838	.....	116 18 0 22	36 12 1 3	34 15 2 24	5 19 2 14	.....	.....	.....	.....	.....	31 13	....	.....	15 0 0 0	64 10 0 0	26 10 0 0	5 10 0 12	111 10 0 12
Oct., 6 days	3,192	.....	5	17 14 1 22	10 0 1 13	7 6 1 20	.....	.....	.....	.....	.....	.....	7 17	....	.....	3 10 0 0	5 10 0 0	10 10 0 0	0 8 0 4	19 18 0 4
	55,789	3,036	75 4-5	396 8 3 24	107 6 2 13	105 7 1 25	37 1 2 8						78 13			118 8 1 16	184 0 0 20	70 0 0 0	11 16 0 12	184 4 2 20
Blast No. 2.																				
Oct. 26 to 31	3,095	.....	17·48	7 7 2 17	2 4 0 7	2 12 0 0	.....	.....	.....	.....	.....	.....	3 9	....	.....	.....	3 15 2 14	2 2 0 6	0 1 0 12	5 18 3 4
November	12,530	.....	61	85 18 0 2	23 11 1 1	17 15 3 8	.....	.....	.....	.....	.....	.....	5 3	....	1 8	22 5 2 19	28 16 1 20	28 6 2 12	0 2 2 20	79 11 1 15
December	14,300	.....	74·8	87 15 2 11	38 5 3 11	.....	.....	.....	.....	.....	.....	.....	4 19	....	11 4	7 13 0 4	19 11 1 10	62 10 0 0	0 12 2 0	90 6 3 14
1841.																				
January	15,310	.....	93·3	100 0 0 20	23 18 0 12	34 8 0 24	.....	.....	8 6 2 7	.....	.....	.....	7 11	....	.....	3 1 1 20	45 11 3 4	52 1 2 12	1 14 3 8	102 9 2 16
	45,235		245·59	281 1 1 22	87 19 1 3	54 16 0 4			8 6 2 7				20 14		12 12	33 0 0 15	97 15 0 20	145 0 1 2	2 11 0 12	278 6 2 21
Blast No. 3.																				
Feb. 17 to 28	6,005	.....	22	30 8 1 25	3 0 0 0	5 5 1 12	.....	.....	.....	3 6 2	.....	.....	2 9	....	1 16	4 11 2 2	14 1 3 4	4 1 0 18	0 7 3 0	23 2 0 24
March	15,430	785	130·20	123 4 2 4	16 8 2 0	16 5 1 12	.....	.....	9 4 0 19	2 10 1	.....	.....	8 9	....	5 9	32 19 2 26	58 7 0 6	18 6 2 2	1 0 0 0	110 13 1 6
April	14,372	1,455	115·16	111 4 1 20	3 17 2 14	23 10 2 24	.....	.....	12 13 2 21	1 15 1	.....	.....	10 0	....	4 16	22 11 0 18	68 3 2 8	11 11 0 18	1 11 0 0	103 16 3 16
May	11,055	.....	117	82 6 0 18	8 2 1 14	8 16 1 20	.....	.....	7 7 3 16	.....	.....	53 4 1 4	.....	8 4	.....	5 1 3 4	39 19 0 2	47 3 0 14	1 10 2 20	93 14 2 12
	46,862	2,240	384·36	347 3 2 11	31 8 2 0	53 17 3 12			29 5 3 0	7 12 0		53 4 1 4	20 18	8 4	12 1	65 4 0 22	180 11 1 20	81 1 3 24	4 9 1 20	331 7 0 2
Blast No. 4.																				
Aug. 10 to 31	11,020	.....	28	66 6 0 0	10 6 0 6	23 7 2 0	.....	.....	.....	.....	5 18 3 20	.....	4 1	....	.....	1 7 0 16	26 12 0 0	29 10 0 0	.....	57 9 0 16
September	15,975	597	68·8	101 11 0 0	7 15 0 0	46 1 0 0	.....	.....	.....	2 3 0	.....	11 0 0 0	8 0	....	.....	.....	19 10 0 0	85 16 0 0	.....	105 6 0 0
October	14,495	825	97·10	94 0 3 11	3 6 0 6	46 13 0 5	.....	.....	.....	.....	.....	7 2 2 20	8 9	....	.....	.....	47 0 0 0	58 10 0 0	.....	105 10 0 0
Nov. to 27th	11,037	452	61·12	93 9 0 0	1 0 0 0	47 6 0 0	.....	.....	.....	.....	.....	.....	5 11	....	.....	.....	25 0 0 0	52 0 0 0	.....	77 0 0 0
1842.	52,527	1,874	254·30	355 6 3 11	22 7 0 12	163 7 2 5				2 3 0	5 18 3 20	18 2 2 20	26 1			1 7 0 16	118 2 0 0	225 16 0 0		345 5 0 16
Blast No. 5.																				
Jan. 12 to 31	10,000	850	45·4	45 18 1 0	3 19 2 0	26 13 3 0	.....	.....	2 13 3 0	.....	.....	.....	5 8	....	.....	1 10 0 0	11 10 0 0	26 0 0 0	.....	39 0 0 0
February	12,415	50	136·8	116 7 0 0	.....	49 11 0 0	.....	.....	2 12 0 0	.....	.....	.....	8 8	....	.....	.....	23 0 0 0	66 0 0 0	.....	89 0 0 0
March	12,782	.....	146	115 9 0 0	.....	56 10 0 0	.....	.....	3 0 0 0	.....	.....	.....	7 10	....	.....	.....	15 0 0 0	73 0 0 0	.....	88 0 0 0
April	12,047	.....	113·26	101 12 0 0	.....	25 0 0 0	.....	.....	.....	.....	.....	22 15 0 0	6 7	....	.....	.....	23 10 0 0	53 0 0 0	.....	76 10 0 0
May to 7th	2,767	.....	23	34 0 0 0	.....	6 6 0 0	.....	.....	.....	.....	.....	2 10 0 0	7 0	....	.....	.....	7 10 0 0	14 10 0 0	.....	22 0 0 0
Blast No. 6.	50,011	900	463·38	413 6 1 0	3 19 2 0	164 0 3 0			8 5 3 0			25 5 0 0	34 13			1 10 0 0	80 10 0 0	232 10 0 0		314 10 0 0
May 30 to June 30	16,110	696	18·29	119 19 0 0	.....	69 7 0 0	.....	.....	.....	.....	.....	.....	8 0	....	.....	.....	49 10 0 0	44 0 0 0	.....	93 10 0 0
July	16,535	2,055	16	154 16 0 0	.....	62 4 0 0	.....	.....	.....	.....	.....	14 12 0 0	8 10	....	.....	.....	80 10 0 0	44 0 0 0	.....	124 10 0 0
Aug. to 24th	12,647	1,715	12·16	123 11 0 0	.....	35 5 0 0	.....	.....	.....	.....	.....	.....	8 2	....	.....	.....	34 0 0 0	61 10 0 0	.....	95 10 0 0
	45,292	4,466	46·45	398 6 0 0		166 16 0 0						14 12 0 0	24 12				164 0 0 0	149 10 0 0		313 10 0 0
Blast No. 7.																				
Nov. 4 to 30	15,290	340	115·22	120 9 0 0	.....	47 3 0 0	.....	.....	.....	.....	.....	7 6 0 0	.....	.....	.....	1 10 0 0	41 15 0 0	47 10 0 0	.....	90 15 0 0
December	15,200	230	145·30	131 14 0 0	.....	61 4 0 0	.....	.....	.....	.....	.....	11 1 0 0	.....	.....	.....	3 10 0 0	63 10 0 0	51 10 0 0	.....	118 10 0 0
1843.																				
January	14,535	.....	186·23	142 1 0 0	.....	40 15 0 0	.....	.....	.....	.....	.....	8 19 0 0	.....	.....	.....	11 0 0 0	59 0 0 0	42 10 0 0	.....	112 10 0 0
February	12,651	470	112·16	127 2 0 0	.....	35 10 0 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 0 0 0	51 10 0 0	42 0 0 0	.....	97 10 0 0
March	12,185	100	151·24	133 6 0 0	.....	39 0 0 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 0 0 0	49 10 0 0	56 10 0 0	.....	108 0 0 0
April to 18th	6,945	1,260	89·14	76 14 0 0	.....	20 11 0 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	3 10 0 0	22 0 0 0	29 0 0 0	.....	54 10 0 0
	76,806	2,400	799·1	731 6 0 0		244 3 0 0						27 6 0 0				25 10 0 0	287 5 0 0	269 0 0 0		581 15 0 0
Blast No. 8.																				
Oct. 18 to 31	6,685	202	11·3	32 1 0 0	1 4 0 0	.....	.....	10 04	1 0 0 0	.....	.....	.....	3 6	....	.....	.....	22 10 0 0	.....	.....	22 10 0 0
November	13,275	4,250	.....	101 11 0 0	.....	9 8 0 0	.....	49 11	0 16 0 0	.....	.....	.....	12 6	....	.....	.....	91 0 0 0	.....	.....	91 0 0 0
December	14,740	740	113·40	115 0 0 0	.....	.....	.....	70 02	.....	.....	.....	.....	12 0	....	.....	.....	12 0 0 0	87 0 0 0	.....	99 0 0 0
1844.																				
January	11,395	.....	118	116 5 0 0	.....	4 19 0 0	.....	43 15	.....	.....	.....	.....	10 8	4 5	.....	.....	5 10 0 0	71 0 0 0	.....	76 10 0 0
February	11,125	.....	123·4	113 12 0 0	.....	.....	.....	51 16	2 18 0 0	.....	.....	.....	9 0	....	.....	.....	.....	85 10 0 0	3 11 0 0	89 1 0 0
March 9th	2,958	.....	30	25 3 0 0	.....	.....	.....	16 15	1 5 0 0	.....	.....	.....	3 4	....	.....	.....	.....	12 0 0 0	.....	12 0 0 0
	60,178	5,192	395·47	503 12 0 0	1 4 0 0	14 7 0 0		242 03	5 19 0 0				50 4	4 5			17 10 0 0	369 0 0 0	3 11 0 0	390 1 0 0

Port Henry Furnace, No. 1—(*Continued.*)

DATE. 1844 *Blast No. 9.*	FUEL USED. Coal. bushels	Brands bush.	Wood. cords.	Hard coal.	ORES USED. Cheever.	Hall.	E. & Green.	Separated.	FLUXES USED. Lime stone.	Cinder	Clay.	Sand.	Grout.	PIG IRON MADE. No. 1.	No. 2.	No. 3.	Plate made.	Whole amount.	Blast No. 1	Coals per ton, 303 bush. Brands " 16¼ " Wood " 2·5 c'rds, Per cent. of ore, 28.	=239 bush.
June 16 to 30	9,025	238	.....	....	64	8 16	1	.....	8	0 16	0	.....	.....	13	15 14	5 15	0	43 0 0	Blast No. 2	Coals " 163 bush	=207 bush.
July	18,197	2,200	50	....	156	17 26	15	10 10	7	8 21	11 38	3	.....	48	0 42	5 18	10	108 15 0		Wood " ·88 cords	
Aug. to 7th..	4,962	238	20·32	....	30	12 7	13	15 6	10	14	13	15	4 0	15	0 19	15 5	10	43 15 0		Per cent. of ore, 64.	
Aug. 18 to 30	3,370	.....	.....	....	54	16 25	14	12 0	....	7	15 7	2 13	8	23	0 11	15 12	0	46 15 0	Blast No. 3	Coals " 144 bush	=206 bush.
Nov. 18 to 30	6,720	.....	.....	....	187	0 118	11	.....	.....	7 18	25	17	.....	21	16 72	5 67	0 31	5 172		Brands " 6·7 "	
December...	27,016	.....	.....	....	257	19 86	0	.....	.....	.....	19	2	.....	31	6 66	0 105	5 54	0 228		Wood " 1·16 c'ds.	
1845—Jan..	2,699	1,212	.....	....	269	14 18	3	.....	.....	.....	41	11	4 9	20	15 81	5 53	5 50	5 134		Per cent. of ore, 63.	
February ...	26,827	1,400	36	....	287	1 50	4	.....	.....	6 18	9	15	.....	30	13 128	0 72	5 9	10		Coals " 157 bush	=201 bush.
March.....	20,006	.....	91	....	226	3 75	8	.....	.....	9 15	19	0	.....	27	8 74	15 93	10 26	15 0 10	Blast No. 4	Brands " 5·59 "	
April.....	15,637	.....	50·8	....	190	5 63	8	.....	.....	8 7	18	2	.....	18	2 90	15 29	10 25	10		Wood " ·76 cords	
May	2,060	1,850	23·9	....	287	17 33	16	.....	.....	8 14	19	18	.....	23	0 75	10 51	10 61	0		Per cent. of ore, 64.	
June.....	3,467	20,460	15	....	335	10	.....	.....	.....	.....	21	3	.....	36	0 15	15 66	0 117	15		Coals " 159 bush	=236 bush.
July	20,790	21,697	21·22	....	307	15	.....	.....	.....	.....	40	10	.....	23	0 6	0 30	0 150	10	Blast No. 5	Brands " 2·86 "	
August	20,625	2,045	14	....	261	7	.....	.....	.....	.....	40	9	11 4	40	17 27	10 83	10 71	10 3		Wood " 1·47 c'ds.	
September ..	1,897	20,625	61	....	272	3	.....	.....	.....	45 4	26	3	24 10	99	10 67	5 12	5 5	3 26	Blast No. 6	Per cent. of ore, 51.	=164 bush.
October	20,185	1,967	82	....	271	19	.....	.....	.....	37 0	23	1 30	0	78	0 85	10 18	10 2	8 1		Coals " 144 bush	
November ...	18,205	.....	78·16	....	262	19	.....	.....	.....	13 0	5	12	.....	74	15 71	15 35	5 1	12 1 23		Brands " 14·21 "	
Dec. to 29th..	17,270	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	52 0	.....	.....	.....	.....	.....		Wood " ·15 cords	
1846 *Blast No. 10.*	325,246	25,670	539·101		3664	2521 13	37 16	18 02	166	7 393	2	41 11	62 18	328 17	989 15	964 5	715 10	22 6 0 15	2691 16 0 13	Per cent. of ore, 54.	
Aug. 11 to 31.	19,354	192	8	....	173	18	.....	.....	17	7 21	10	23 0	.....	71	5 30	15 9	10	.....		Coals " 132 bush	=205 bush.
September...	26,763	4,044	.....	16 16	312	8	.....	.....	27	9 31	14	42 0	.....	85	5 110	10 20	5 3	14 1 14		Brands " 4·13 "	
October	23,837	7,026	10	7 0	337	9	.....	.....	7	8 29	12	38 0	18 0	52	0 116	15 58	10 0	9 0 3		Wood " 1·37 c'ds.	
November ..	28,057	3,306	96	.....	352	8	.....	.....	7	12 30	8	40 0	14 0	74	15 96	10 57	5 1	18 2 18	230 8 2	Per cent. of ore, 58,	
December...	29,073	5,862	65	.....	355	15	.....	.....	7	17 31	9	38 0	18 9	64	17 117	10 52	15 2	7 2 8	237 9 2	Coals " 154 bush	=218 bush.
1847—Jan...	26,371	3,120	92	.....	337	14	.....	.....	7	5 29	5	37 10	18 15	117	15 83	0 20	15	.....	221 10 0 0	Brands " 13·31 "	
February....	24,035	1,086	12·9	.....	282	0	.....	.....	7	15 31	0	32 0	15 0	46	5 76	0 67	10	.....	189 15 0 0	Wood " 1·01 c'ds.	
March.....	27,779	1,188	82	.....	312	13	.....	.....	8	14 34	19	34 15	7 7	111	15 72	10 24	5	.....	208 10 0 0	Per cent. of ore, 51,	
April.....	21,960	1,744	97	.....	299	7	.....	.....	9	16 39	4	33 4	16 13	86	15 63	15 58	10	.....	209 0 0 0	Coals " 121 bush	=141 bush.
May to 5th..	3,160	846	14	.....	43	14	.....	.....	1	8 5	13	4 17	2 8	3	0 18	15 16	10	.....	38 5 0 0	Brands " 9·53 "	
																				Wood " 1·5th c.	
	230,389	28,420	623		23 16	2807 0			102	11 284	14	323 6	110 12	713	12 786	0 385	15 8	9 2 15	1893 16 2 15	Per cent. of ore, 63.	
New Furnace. Blast No. 1.																			Blast No. 10	Coals " 122 bush	
Oct. 23 to 31.	7,915	702	30 1·2		13 10	76 14			4	1 8	2	8 11	4 5	23	15 8	10	.....	.....		Brands " 15 "	=140 bush.
November...	28,600	1,176	143 2·3		1 4	355 8	.....	.....	7	13 34	6	39 9	39 15	41	5 153	0 32	5 0	5 0 0	32 5 0 0	Wood " ·03 cords	
December...	32,925	2,130	153 9·13		1 6	360 0	.....	.....	11	5 39	6	40 0	20 0	40	10 139	0 49	5	.....	226 15 0 0	Anth. coal 28¼	
1848—Jan...	13,480	858	24 5·6		1 3	133 11	.....	.....	3	9 13	18	14 17	7 8	18	15 57	5 23	10	.....	98 10 0 0	Per cent. of ore, 67.	
																			New Furnace,	Coals " 142 bush	=183 bush.
	83,070	4,866	352 27·36		16 0	925 13			26	8 95	12	102 17	71 8	124	5 357	15 104	0 0	5 0 0	586 5 0 0	Brands " 8·3 "	
																			Blast No. 1	Wood " ·6 cords	
																				Anthracite, 60¼	

ing them and the flux together wet, that the particles of one may adhere to those of the other, and so remain till they melt together in the furnace. Crucible experiments with refractory materials only succeed where these are previously brought into the closest mixture and mechanical union with the fluxes by thorough grinding; and furnace operations are but such experiments on a greatly enlarged scale.

The proportions of clay or marl and fine ore are not defined in the specifications of the patent: they may be used in any proportion. As I have seen it employed in Essex county, it was 10 parts of ore to one of clay—to which was added both quartz and limestone. What the patent intends to restrict is the use of clay or marl mixed up with water into a paste or grout.

One will be surprised in these tables at the large consumption of fuel to the ton of iron, and the great extremes, between which it varies. The magnetic ores never work so economically as the hematites and carbonates; but so great an expense for fuel as at these furnaces during some of the blasts is by no means usual.

In the furnace books the cost of charcoal is rated at 6¼ cents a bushel; that of Cheever ore sometimes at $1,25; and sometimes $1,50 per ton; and of wood at $2,50 per cord. In September 1847, there were made at the lower furnace (No. 2.) 242 tons 15 cwt. of pig metal, and 13 tons 15 cwt., of plate metal, making in all 246¼ tons. The consumption of stock in this time was 30,450 bushels of *charcoal*, and *brands* equivalent to 4,548 bushels more.

These at 6¼ cents make	$2,274 87
also—106 cords of wood at $2,50.	265 00
and 397.9 tons of ore at $1,25.	497 38
	$3,037 25

The cost then for these items is $12,32 per ton.

In the succeeding seven months the Cheever ore is rated at $1,50 per ton. The production of metal and cost of fuel and ore in these months, I have condensed from the books and summed up in the following table.

	Production. Pig Metal.	Plate Metal.	Cost of fuel and ore.
1847—Oct.	283 t. 5 cwt.	3 t. 18 cwt.	$3,547 51
Nov.	253 " 15 "	0 " 19 "	3,120 86
Dec.	284 "		3,303 87
1848—Jan.	249 "		3,081 71
Feb.	221 " 10 "		2,567 74
Mar.	240 " 10 "		2,979 69
Ap'l	220 " 15 "		2,812 37
	1751 t. 15 cwt.	4 t. 17 cwt.	$21,413 75

During these seven months these two items cost at the rate of $12·19 per ton of metal. But in the long run a considerable allowance it is found must be made for loss of stock, that never goes into the furnace, this amounting in charcoal particularly to much more than is generally supposed. Beside this for the whole cost of manufacture the usual allowance of about five dollars per ton should be added for the other items of flux, labor, superintendence, repairs and interest.

The furnace property beside the works and mines includes a large number of houses for workmen and agents, workshops of various kinds and 2200 acres of land—a village has grown up in the vicinity of the works which thrived with their prosperity, but like all the surrounding country, now suffers from the blight, that has fallen upon the iron business.

H.

Port Henry Furnace, No. 2.

DATE.	FUEL USED.			ORES USED:						FLUXES USED.						Plate made.	PIG IRON MADE.			Whole amount
	Coal. bushels	Brands bush.	Wood. cords.	Cheever.	Sanford.	Hall.	Hematite.	Washed.	Daliba.	Cinder	Lime stone	Clay.	Sand.	Grout.	S. Iron		No. 1.	No. 2.	No. 3.	
Blast No. 1. 1841.																				
July	13,582	740	.....	98 8	18 4	35 11	14 1	.....	....	.....	10 3	....	.....	.....	0 1	.....	2 11	47 0	43 0	92 0
August	15,827	1,545	58	142 17	23 3	62 0	7 18	.....	....	.....	10 10	....	.....	.....	....	.....	8 10	77 10	49 10	135 10
September	15,360	1,195	74·12	118 0	.....	49 8	3 1	11 9	....	.....	13 10	....	.....	.....	....	.....	.....	55 10	47 10	103 0
October	15,287	572	74	129 12	.....	69 1	.....	3 5	9 1	.....	13 15	....	.....	.....	....	.....	.....	65 10	48 10	114 0
November	12,825	1,336	54·14	119 19	.....	64 7	.....	.....	....	.....	11 9	....	.....	.....	....	.....	.....	96 0	11 0	107 0
December	14,350	595	142	139 18	.....	76 10	.....	.....	....	.....	12 13	....	.....	.....	....	.....	4 0	90 0	29 10	123 10
1842.																				
January	12,282	2,210	105·8	104 10	.....	67 1	.....	.....	....	.....	10 9	....	.....	.....	....	.....	9 0	56 10	40 0	105 10
February	12,317	105	136·16	138 1	.....	56 8	.....	.....	....	.....	10 19	....	.....	.....	....	.....	14 0	70 10	40 0	124 10
March	12,527	.....	142·4	147 1	.....	68 10	.....	.....	....	.....	12 8	....	.....	.....	....	.....	.....	83 10	48 0	131 10
April	11,562	.....	86 28	128 2	.....	73 1	.....	.....	....	.....	13 19	....	.....	.....	....	.....	1 10	92 0	19 10	113 0
May	10,585	.....	92·16	127 10	.....	55 16	.....	.....	....	.....	11 18	....	.....	.....	....	.....	.....	41 10	58 0	99 10
June to 20th.	6,325	.....	50·13	82 9	.....	38 12	.....	.....	....	.....	9 8	....	.....	.....	....	.....	2 0	42 0	20 0	64 0
	152,829	8,298	1013·101	1476 7	44 7	716 5	25 0	14 14	9 1		141 1				0 1		41 0	81 7	454 10	1313 0
Blast No. 2.																				
Aug. 8 to 31.	6,807	795	.....	36 10	.....	14 13	.....	.....	....	.....	3 4	....	.....	.....	....	.....	.....	7 10	18 10	26 0
September	16,232	1,205	92·26	123 10	.....	45 19	.....	.....	....	.....	14 6	....	.....	.....	....	.....	2 0	32 10	63 10	98 0
October	17,532	480	133·10	149 5	.....	60 3	.....	.....	....	.....	.....	....	.....	.....	....	.....	4 0	47 0	73 10	124 10
November	14,840	110	121·28	134 16	.....	54 6	.....	.....	....	.....	.....	....	.....	.....	....	.....	8 0	70 10	36 0	114 10
December	13,783	5,050	.....	141 0	.....	40 2	.....	.....	....	.....	.....	....	.....	.....	....	.....	2 0	68 10	46 0	116 10
1843.					.....															
January	15,790	.....	164·8	163 0	.....	41 4	.....	.....	....	.....	.....	....	.....	.....	....	.....	3 10	98 0	28 0	129 10
February	12,928	850	152·9	131 0	.....	39 9	.....	.....	....	....	.....	....	.....	.....	....	.....	12 0	47 10	51 10	111 0
March	12,663	365	171·9	147 6	.....	37 12	.....	.....	....	.....	.....	....	.....	.....	....	.....	7 10	71 0	38 10	117 0
April	12,477	500	174·12	149 4	.....	28 8	.....	.....	....	.....	.....	....	.....	.....	....	.....	1 10	76 0	42 0	119 10
May	13,040	550	191	160 12	.....	26 4	.....	26 12	....	.....	.....	....	.....	.....	....	.....	4 0	101 10	27 0	132 10
June to 26th.	10,400	.....	162·10	142 3	.....	35 11	.....	5 12	....	4 0	.....	....	.....	.....	....	.....	.....	84 10	25 10	110 0
	146,492	9,905	1359·105	1478 6		423 11		32 4		4 0	17 10						44 10	704 10	450 0	1199 0
Blast No. 3.							E. & Green.													
July 20 to 31.	7,207	7,207	9·6	35 2	.....	11 7	.....	.....	....	0 17	3 13	....	.....	.....	0 17	.....	.....	17 10	10 10	28 0
August	12,862	1,850	81·8	96 15	14 9	38 1	.....	.....	....	3 18	.....	....	.....	.....	2 13	.....	.....	41 0	69 0	110 0
September	12,900	1,750	101·4	76 10	19 0	9 12	99 4	.....	3 13	.....	16 8	....	.....	.....	....	.....	.....	7 10	112 10	120 0
October to 6th	1,710	400	8·4	1 15	.....	.....	25 5	.....	5	.....	0 11	....	.....	.....	....	.....	.....	.....	11 0	11 0
	34,679	11,207	199·22	210 2	33 9	59 0	124 9		3 18	4 15	20 12				3 10			66 0	203 0	269 0
Blast No. 4. November 22 to 30	5,645	1,100	.....	25 19	1 17	.....	12 11	.....	1 1	.....	0 15	....	.....	.....	....	.....	.....	13 10	4 10	18 0
December	14,770	6,600	5·7	97 14	.....	18 7	47 2	.....	5 8	4 5	18 0	....	.....	.....	....	.....	.....	32 10	49 10	82 0
1844.																				
January	13,207	5,500	29·4	120 15	.....	27 7	18 6	.....	16	5 0	15 10	....	.....	.....	0 16	.....	.....	1 10	76 0	77 10
February 5	2,095	500	10·7	20 11	.....	7 6	.....	.....	14	0 10	2 13	....	.....	.....	0 4	.....	.....	.....	14 0	14 0
	35,717	13,700	44·18	264 19	1 17	53 0	77 19		7 19	9 15	36 18				1 0			47 10	144 0	191 10
Blast No. 5. April 27th to June 1st	20,732	3,640	28½	142 7	.....	54 4	12 8	4 15	....	.....	.....	....	.....	.....	....	.....	6 15	75 15	45 0	127 10
June	15,367	.....	85½	156 0	.....	44 15	5 0	.....	....	.....	.....	....	.....	.....	....	.....	5 0	78 0	47 15	130 15
July	15,142	60	83	145 11	.....	49 7	.....	.....	....	.....	.....	....	.....	.....	....	0 10	15 5	83 0	22 5	121 0
August	20,025	1,250	84½	298 4	.....	32 2	28 6	.....	....	.....	.....	....	.....	16 2	....	3 0	101 5	39 5	13 10	157 0
September	24,135	1,005	27	278 10	16 6	53 6	.....	.....	....	11 9	24 9	....	.....	24 18	....	3 0	118 5	62 10	9 10	193 5
October	29,625	2,225	.....	260 10	19 14	46 6	.....	66 8	....	6 2	13 2	....	.....	24 12	....	2 5	125 10	53 15	43 10	225 0
Nov. to 13th.	11,522	1,257	.....	78 4	19 11	39 2	.....	.....	....	4 4	4 10	....	.....	9 16	...	0 10	57 10	27 0	12 10	97 10
	136,548	9,432	308⅜	1359 6	55 11	319 2	45 14	70 15		21 15	42 1			75 8		9 5	429 10	419 5	194 0	1052 0
Blast No. 6. 1845.																				
Mar. 22 to 31	7,400	.....	15	36 5	.....	5 8	.....	.....	....	4 16	3 3	....	.....	6 1	....	.....	15 0	12 5	.....	27 5
April	22,865	675	.....	204 5	.....	.....	68 2	.....	....	14 16	6 11	....	.....	24 15	....	.....	107 10	35 5	17 5	160 0
July 13th	13,997	2,380	20	118 0	.....	50 0	.....	.....	....	12 16	8 10	....	.....	12 0	....	.....	27 15	28 5	27 10	83 10
August	24,832	2,587	24·22	304 0	.....	76 0	.....	.....	....	14 15	3 18	....	.....	31 17	....	.....	96 10	64 0	62 5	222 15
September	27,788	2,667	29·24	296 3	.....	73 10	.....	.....	....	36 1	18 0	....	3 9	70 0	....	.....	110 10	106 0	29 10	246 0
October	26,042	2,480	30·9	270 8	.....	67 0	.....	.....	....	33 17	8 8	....	3 4	65 0	....	.....	129 5	69 17	30 0	229 2
November	25,712	760	87·1	298 0	.....	.....	.....	74 0	....	33 7	8 6	....	4 9	70 0	....	.....	57 5	106 15	86 15	250 15
December	23,450	2,950	67·28	339 15	.....	.....	.....	.....	....	29 18	7 9	....	.....	.....	....	.....	50 5	117 0	70 15	238 0
1846.																				
January	26,743	5,724	83·19	385 7	.....	.....	.....	.....	....	34 18	8 14	....	.....	.....	....	.....	93 15	138 15	36 10	269 0
February	26,220	5,316	61·16	339 4	.....	.....	.....	.....	....	31 14	7 16	46 7	27 18	.....	....	.....	133 5	81 15	24 5	239 5
	225,049	25,539	427·1	2591 7		271 18	68 2	74 0		246 18	80 15	46 7	39 0	279 13			821 0	759 17	384 15	1665 12

Port Henry Furnace, No. 2—(*Continued.*)

DATE. 1846.	FUEL USED. Coal. bush.	Brands. bushels.	Wood. cords.	ORES. Cheever.	FLUXES USED. Cinder	Lime stone.	Clay.	Sand.	Plate made	PIG IRON MADE. No. 1.	No. 2.	No. 3.	Whole amount	
Blast No 6, (continued.)														
March.....	22,608	4,572	128	361 15	25 12	7 6	51 0	31 14	.....	123 0	65 5	48 10	236 15	Blast. No 1, Coals per ton, 116 bush. Brands " 6·3 " Wood " 4-5 cords, = Bush. 162. Per cent. of ore, ·57.
April.....	16,932	4,413	118·24	297 0	25 3	6 6	40 0	19 0	6 6	47 0	113 5	34 5	200 16	
May to 27th	14,632	3,687	79·10	242 17	21 7	7 6	32 0	16 0	.....	2 10	124 10	39 10	166 10	
	54,172	12,672	325·34	902 12	72 2	20 18	123 0	66 14	6 6	172 10	303 0	122 5	604 1	No. 2, Coals per ton, 122 bush. Brands " 8 3 " Wood " 1·13 crds. = 187. Per cent. of ore, 62.
Blast No. 7. 1847.														No. 3, Coals per ton, 128 bush. Brands " 41 4-5 " Wood " ¾ cords. = 207. Per cent. of ore, 60.
Jan. 4th....	25,904	2,676	78¼	297 19	27 13	8 19	33 2	16 11	.....	66 15	97 15	18 5	182 15	
February ..	26,664	3,078	91·29	324 12	28 17	7 4	36 1	18 0	.....	43 15	117 10	53 0	214 5	No. 4, Coals per ton, 181 bush. Brands " 71½ " Wood " ·23 crds. = 271. Per cent. of ore, 47.
March.....	31,168	4,254	98·10	389 3	33 14	8 8	43 5	21 12	.....	79 0	103 15	65 10	248 5	
April.....	26,651	2,937	99·12	346 0	37 16	9 9	38 9	19 4	.....	47 0	119 5	49 5	215 10	
May.....	27,010	6,474	61·2	347 2	34 9	8 12	39 7	19 13	5 14	30 15	116 0	53 15	206 4	No. 5, Coals per ton, 130 bush. Brands " 9 " Wood " ·29 cords = 154. Per cent. of ore, 57.
June	27,480	6,522	63·3	389 2	32 14	8 4	.....	.....	9 12	34 0	115 5	74 15	233 12	
July.....	31,875	6,480	87·1	455 0	38 0	9 10	50 13	25 6	.....	53 15	104 5	22 15	280 15	
August	33,945	4,086	129·2	423 15	39 18	10 0	47 1	23 11	2 18	21 0	102 10	133 0	259 8	
September .	30,450	4,548	106 6	397 18	36 5	9 2	45 0	22 18	3 15	31 0	140 0	71 15	246 10	No. 6, Coals per ton, 109 bush. Brands " 15 " Wood " ·29 cords Anth. coal 12 = 138. Per cent. of ore, 65·
October....	34,005	6,150	103·5	453 4	40 9	20 5	50 7	25 4	3 18	78 0	191 5	14 0	287 3	
November .	30,210	2,520	141·1	418 16	35 19	18 0	46 11	23 5	0 19	80 15	139 10	33 10	254 14	
December..	32,315	2,682	151·7	433 8	40 9	17 18	48 4	24 1	.....	51 0	171 15	61 5	284 0	
1848.														
January ...	29,950	5,856	66 1-6	392 12	34 12	17 6	43 13	21 16	.....	108 15	114 10	25 15	249 0	No. 7, Coals per ton, 122 bush. Brands " 18½ " Wood " ¾ crds. Anth. coal 7 4-5 = 160. Per cent. of ore, 62.
February ..	23,950	3,332	103·10	356 11	28 17	14 8	39 23	19 16	.....	27 10	162 10	31 10	221 10	
March.....	28,425	3,984	116·5	388 1	33 16	16 18	43 2	21 11	.....	72 5	134 0	34 5	240 10	
April.....	28,760	5,148	26½	361 8	34 4	17 2	40 3	20 2	.....	77 5	80 15	62 15	220 15	
May to 23..	24,480	4,010	9·7	303 7	29 11	14 15	36 14	13 17	.....	88 0	95 0	18 10	201 10	
	493,242	74,737	1528·121	6477 18	587 3	216 0	681 5	336 7	26 16	990 10	2105 10	923 10	4046 6	

English Railways.

The North British Review for August, contains a long article upon the railways in the United Kingdom, in which is collected much valuable information from the..[illegible] of which is a recent volume by Harry Scivenor, upon the "extent, capital, amalgamation, financial position, the Acts of Parliament by which regulated, creation and appropriation of shares, calls, dividends, &c., of the railways of the United Kingdom." The article is evidently written by a novice in railway matters, and is only valuable for the statististical information and opinions of others, compiled from the works reviewed; and as indicating the views of a large party in favor of government interferance in the management of roads. The writer, like all ignorant men, talks with a most authoritative air, and illustrates his knowledge of railways in the following manner.—In a minute description which he gives of them, after speaking of the earlier attempts in their construction, he says: "the rails of railways, however, are now almost universally made of *cast iron*!"—This is news on this side of the water, and we presume it is to every one in England, save the writer of the article. We dislike exceedingly to meet such gross ignorance in an article which we wish to read, for it generally shuts the book against any further perusal. We promise our readers, however, to give them nothing based upon his authority without due notice of the fact. In another part of the article he introduces propnesy, as foreshadowing the present mode of locomotion, and gravely suggests, whether the following passage from Isaiah—"Make straight in the desert a highway for our God. Every valley shall be exalted, and every mountain and hill shall be made low, and the crooked shall be made straight, and the rough places plain, and the glory of the Lord shall be revealed." And also the following from Daniel—"The time from the end, *when many shall run to and fro*, and knowledge shall be increased," do not actually refer to the present railway system!!! So much for the knowledge and Biblical criticism of one of the *leading* English Quarterlies.

With the history of the earliest attempts at railways in England, we presume that most of our readers are familiar. They were first used at the New Castle colleries in the beginning of the seventeenth century. They were constructed in the outset entirely of wood, and in the latter part of the last century they were merely tracks of wood, iron or stone, over which wagons loaded with coal were drawn by horses. The great saving made by the use of these rude contrivances over the ordinary road, led to the construction of these lines on a much larger and more comprehensive scale. In 1801, the first act for a public railway was granted, and from that time to 1837, 178 acts were obtained. From one or two annually, they began to increase in 1825, when their number rapidly augmented, as will be seen by the following table:—

	Acts.		Acts.
1824.....	2	1831.....	9
1825.....	5	1832.....	8
1826.....	6	1833.....11	
1827.....	6	1834.....14	
1828.....11		1835.....18	
1829.....	9	1836.....35	
1830.....	9	1837.....14	

The most important of the earliest of these railways was the Stockton and Darlington in the neighborhood of New Castle. It obtained its act in 1823, and was opened Sept. 27, 1825. All kinds of locomotive power was employed on this line. The ascents and descents on it were numerous, and it was found very difficult for the imperfect locomotive of that day to work to any advantage. When the Liverpool and Manchester road was first opened, two professional engineer were sent by this company to inspect the workings of the Stockton and Darlington road. These engineers reported that the advantages of the stationary and locomotive engine, as a motive power on a railroad, were nearly balanced, but that on the whole, the stationary engine was preferable. Mr. Stephenson, the engineer of the Liverpool and Manchester road, was, however, of a different opinion; and through his influence the Directors of the company were induced to offer a premium of £500 for the most approved locomotive engine, to be submitted to public heat on the 6th day of October, 1829. Four engines appeared as competitors for the prize, the Novelty, by Braithwait & Ericsson, the Rocket, by Robt. Stevenson & Co., the Sans Pariel, by Mr. Hackworth, and the Perseverance, by Mr. Burstall. The experiments were in the highest degree satisfactory, and established conclusively the superiority of the locomotive engine; and we, at the present day, and in the perfect state to which the locomotive is now brought, are surprised at the speed then obtained. The premium was awarded to the Rocket, though the Novelty proved itself superior in point of speed. The results these experiments established, proved conclusively the superiority of railway over every other kind of locomotion, and gave to railroads the most decided impulse they had yet received.

The Liverpool and Manchester was the first great line of railway with which England is now covered. It was, as Mr. Scrivenor calls it, "the first born of the great family of railways—the pilot—the pioneer—the model, after which all others were to shape their course, their fashion, their appearance."

No works of extreme magnitude were required in its construction. The line of its course was comparatively level, and, uniting the manufacturing metropolis of England with Liverpool—the greatest thorougfare in the world—its success as a commercial speculation was certain, and hence it gave encouragement to other undertakings, where

equal success could scarcely be anticipated, and to some where ultimate loss was unavoidable. In this respect it bore the same relation to the railways of England, as did the Erie Canal to works of a simi- lar k[illegible]d in various parts of the United States. The unexample[illegible] success of this great work led to the construction of n[illegible] numerous canals on a scale of great magnitude from whic[illegible] similar results were anticipated, without taking into c[illegible]consideration that in no part of this country, and perhaps [illegible]ve may say in the world, did such conditions, which he[illegible]re rendered success certain, exist. The Erie is the grand[illegible] trunk line between the ocean and great inland seas, while most of the canals in the country, with the exception of those of Pennsylvania and Virginia, are but feeders to it, most of them have failed to realize the results anticipated, and there is hardly a canal in the country the proprietors of which would not now gladly convert into a railroad if they could.

In 1833, Acts were obtained for the Grand Junction Railway from Warrington to Birmingham, and for the London and Birmingham railway, so as to unite with the Metropolis the three great cities of Manchester, Liverpool, and Birmingham. Although these new lines presented great difficulties of construction, or occasioned a greater outlay of capital, than the parent line, yet the original shareholders realized high profits; and when the public saw that all the practical difficulties of the railway system were overcome, and that the three first lines that were executed yielded large profits, they rushed headlong into a course of wild speculation, which was attended with the most ruinous consequences. The following account of the panic which ensued is given by Mr. Scrivenor:—

"The early struggles for existence which every new-born system has to endure in this country, have already been brought under notice.—These past and overcome, then came the wild burst of popular feeling in its favor, at a season (1845) when many combined causes prevailed to induce an over estimate of its value. The public had witnessed the success of those who were the first proprietors of shares in the Liverpool and Manchester railway, the Grand Junction railway, and the London and Birmingham. Dazzled by the profits that had been received from these undertakings, they eagerly grasped at original shares in new lines, deeming the same success awaited them. The results and consequences are well known. Many were ruined! because in those days when giddy speculation of all sorts abounded, men bought shares at an advanced premium in a line not even commenced. Then succeeded a reaction most lamentable in its effect, prostrating at once those who had been blinded by the illusive prosperity of the period, and retarding the advancement of good *bona fide* projects. The public omitted in their calculations the element of *Time*; and it does not follow, that because a line, without even a rail laid upon it, or a barrowful of earth removed from its surface, was wrongly valued at a premium in 1845; yet that same line, in *due time*, will have struggled through the infancy of its construction, and will yield to its promoters a goodly dividend; *then*, but not till then, can the premium it is worth be truly computed.

"The vicissitudes of the period did not end here. The public became alarmed, and panic after panic followed in quick succession, reducing to a nominal value the better class of shares. Scarcely had these panics commenced their destructive influence in the railway world, when the mercantile world suffered calamitous reverses—so intimate are the relations of property. Commercial men, to meet their engagements, sold the railway stock they possessed, reducing, by their sales, to a lower level, this depressed property. Times did not mend; the pressure upon the money market increased; and convulsion after convulsion rent and struck the delicate fabric of commercial credit. The huge structure at last gave way, and, in its crash, seemed to involve all in one common ruin. The bitter storm blew round the world; for England's stability is the keystone in the arch of commerce, and that touched and shaken, quickly spread a baneful influence over ever colonial market, and, indeed, more or less, over every market in the known world."—*Introduction*, p. 20.

In 1843, the number of miles of railway opened at the middle of the year were

		1857 miles.	Increase.
In 1844, at Jan. 1st		1952 "	95
1845, " "	"	2148 "	116
1846, " "		2441 "	293
1847, " "		3036 "	595
1848, " "		3870 "	834
1849, " "		5007 "	1137

Previous to December 31, 1843, Parliament authorized the opening of 2285 miles of railway, and every one of these has been executed.

In 1844, 805 miles were authorized, and of these only 21 miles remain to be executed.

In 1845, 2700 miles were authorized by Parliament; and of these, at the present moment, 1298, or nearly *one-half*, are yet unexecuted.

In 1846, the mania was at its height, and 4538 miles were sanctioned by the legislature. Of these 4056 miles, or nearly 8-9ths are yet unexecuted.

In 1847, when the speculation had begun to subside, 1354 miles of railway were authorized by Parliament; and 1300 remain to be executed, the companies having found the means only to complete 54 miles, or 1-25th of the whole.

In 1848, only 330 miles were authorized, and not a single mile of these has been executed.

How many of these lines thus authorized will be opened, the following statement of the railway commissioners of Great Britain, will enable us to conjecture.

"There can then be little doubt that a very large proportion of the authorized railways will not be completed, although no estimate can at present be formed of the extent likely to be abandoned. The time for the completion of nearly the whole of the lines authorized in 1845 and 1846, which are not in progress, has been extended by the commissioners of the Act above referred to, (11 Vict. cap 3, passed in December, 1846,) as applications for such extension are under their consideration. And at present it can only be considered that about 85 miles of the lines authorized in 1844, and about 415 miles of those [illegible] financial statements published by *thirteen* of the principal companies, *it appears probable that not less than 1260 miles*, in addition to the above, (1710 in all,) may be abandoned. When it is remembered by how few companies these statements have been made, is not perhaps too much to assume that *one-half* of the 4800 miles of authorized railways, of which the works are not in progress, will never be completed under the existing Acts of Parliament—*Report of Railway Commissioners*, 1848. Part II. pp. vi. vii. Dated May 1, 1849.

The following tables exhibit the trafic possessed by these railways the pecuniary returns they have yielded.

Years.	Number of Passengers.	Receipts from Passengers.
1843, "	23,466,896, "	£3,110,257
1844, "	27,763,602, "	3,439,294
1845, "	33,791,253, "	3,976,341
1846, "	48,796,983, "	4,725,216
1847, "	51,352,163, "	5,149,002
1848, "	57,965,070, "	5,720,382

Years.	Receipts from Goods.	Total Receipts from Goods and Passengers.
1843, "	£1,424,932, "	£4,535,189
1844, "	1,635,380, "	5,074,674
1845, "	2,233,373, "	6,208,719
1846, "	2,846,353, "	7,565,569
1847, "	7,362,884, "	8,510,886
1848, "	4,213,169, "	9,933,552

In order to learn what classes of society contribute to the support of the railway system in Great Britain and in what proportion, we take the year from 30th June, 1847, to 30th June, 1848, the number of miles that were open at the begining of this period being 3507, and the number open at the end of it, 4357:—

	Passengers.	Receipts.
First Class, "	7,190,779 "	£1,792,533
Second Class, "	21,690,509 "	2,353,153
Third Class "	15,241,529 "	661,038
Parliamentary Class,	13,092,489 "	902,851
Mixed, " "	749,763 "	11,807

The above tables show a remarkable diversity in the social condition of the United States and Great Britain, and in the ideas which are the result of such diversity. In the latter country only about ¼ of the whole number of passengers travel in the first class cars. In this country at least ⅞ths are first class.—In a recent conversation with an intelligent superintendent of one of the Massachusetts roads upon this subject, he said, "none but Irishmen take the second class cars; an American feels humiliated by doing so; even the Negro always takes the first class." In the Slave States we presume that the case is different; but as a general rule, so strong is the sense of equality in this country, that an American would feel himself degraded, by placing himself in a position that would imply any distinction between the richest or most favored with us. Our social condition confers none, but extends the same privileges and political rights to all; and this theoretical equality is most zealously maintained in practice. It is this real equality that secures such uniform courtesy which characterises the intercourse between all classes in this country, and which is witnessed in no other.

Taking the average number of miles open during the half-year at 4756, the receipts for each mile would average £1208. On the following principal lines this average differs greatly:—

On the London and North Western it is		£2625
" Edinburg and Glasgow,	"	1853
" Great Western,	"	1795
" Lancashire and Yorkshire,	"	1681
" South Eastern,	"	1675
" London, Brighton, and South Coast,	"	1657
" Midland,	"	1385
" South Western,	"	1341
" Eastern Counties,	"	1298
" York, Newcastle, and Berwick,	"	1170
" Caledonian,	"	837
" Eastern & North Midland,	"	723
" Great Southern and Western of Ireland,	"	700

In their latest Report the Railway Commissioners have endeavored to estimate the amount of money expended on the construction of railways:—

"The returns which will enable them to do this accurately are being received by them, and will, on their completion, be laid before Parliament. They believe, however, that the expenditure in 1848 was less than that in 1847, nearly as large as the expenditure in 1846; that at the end of 1848, rather more than £200,000,000 (*two hundred millions*) had been expended on railways; that the companies retained power to expend upon authorised railways £140,000,000, (one hundred and forty millions,) and that the extension of time which has been granted to so many companies, will allow this expenditure to be distributed over five or six years. But it has already been stated, that it appears probable that a large proportion of the lines not now in progress, will never be completed; and if it be assumed that at least one half of the lines which are not in progress will be entirely abandoned, it may also be assumed that £50,000,000 (fifty millions) of authorised capital will not be required."—Report for 1848, Part ii. p. 7.

The following tables show the progress and extent of the decline in some of the principal English roads within a period of two years:

	London and N. Western.	London and S. Western.	G. Western.	Midland.	Average.	Consols.
July 3, 1847, .	184	134	146	130	148	89
Jan. 1, 1848, .	150	102	112	109	118¼	85¼
July 1, 1848, .	120	92	99	100	110¾	84
Dec. 30, 1848, .	124	80	91	85	95	88
April 20, 1849, .	133	76	95	76	95	92

This enormous decline we presume was owing in part to similar causes that has caused such an uni-

form decline of stocks in this country; to an overestimate put upon their value, from declaring dividends based upon one-half or two-thirds of the cost of the road, which could not be sustained when the whole amount of expenditure required, were completed. In addition to this, the stocks in all the English roads were at that time very nearly under the control of the stock jobbers, and a ficticious value given them by the influence of this class. The cost of the English roads, however, in proportion to the business is much greater than ours;—and when we look at some of the items of their cost, we shall cease to wonder at their great decline. The following table shows the cost in dollars of the most important English roads.

The present market value of the stock in the roads which represent this enormous expenditure is not over £75,000,000, making a loss of over £125,000,000, or more than $625,000,000! The ability of a country no larger than the United Kingdom, to lose so large a sum and still save itself from bankruptcy, is full evidence of its enormous wealth and resources.

	Per Mile.
Blackwall railway	$1,400,000
Croydon	402,000
Manchester and Bury	350,000
Manchester and Leeds	322,940
Manchester and Birmingham	301,000
Brighton	285,000
Manchester and Sheffield	280,000
Eastern Counties	230,000
Great Western	235,000
South Eastern	222,000
North Western	222,000

Leaving out the Blackwall, which is a short London road, and the average expense of the remaining per mile is $284,575! Some idea of the cause of apparently such profligate expenditure may be formed from the following facts:

Parliamentary Expenses of Railroad	$72,070
" " Eastern Counties	4,430
" " Manchester and Birmingham	25,950
" " Brighton	24,030

Parliamentary expenses embrace the cost of the appliances made use of to obtain a charter. Thank heaven our Legislation is not so completely corrupt as to make the cost of obtaining a charter, the price of bribery. As a general rule with us, they do not cost the grantees one cent.

The following sums per mile were paid for land and right of way:—

	Per Mile.
Manchester and Birmingham	$81,310
Eastern Counties	79,405
Brighton	50,525
Average per mile	70,415

The cost of the right of way of these roads exceed by 2½ the average cost of railways in this country.

The following is a list of a few of the principal tunnels on English lines:

	Length in Yards.	Height in Feet.	Width in Feet.
The Box tunnel,	3123	27	25
Manchester and Leeds tunnnel,	2860	21½	24
Kilsby tunnel,	2423	27	23½
Liverpool and Mandhester tunnel, from Wapping to Edgehill,	2216	16	22
Abbots' Cliff tunnel, Dover	2286	25	24
Lime Street,	2000	19	25
Watford, on the London and Birmingham,	1830		
Leicester and Swannington,	1660	13½	10½
Shakspeare tunnels, Dover double,	1430	30	24
Primrose Hill,	1250	25	22
Edinburgh and Granton,	1001	17	24
Bangor tunnel,	924		
Canterbury and Whitstable,	880	12	12
Callander, Edinburgh and Glasgow,	830	22	26
Leeds and Selby,	700	17	22
Penmaenbach, Chester and Holyhead,	632	24	

The following extract illustrates the superior productiveness of modern over ancient labor:

The great Pyramid of Egypt was, according to Diodorus Siculus, constructed by three hundred thousand—according to Herodotus by one hundred thousand men; it required for its execution 20 years, and the labor expended on it has been estimated as equivalent to lifting 15,733,000,000 (fifteen thousand seven hundred and thirty-three millions) of cubic feet of stone one foot high. Now, if in the same measure the labor expended in constructing the *Southern* division only of the present London and North Western railway be reduced to one common denomination, the result is 25,000,000,000 (twenty-five thousand millions) of cubic feet of similar material lifted to the same height, being 9,267,000,000 (nine thousand two hundred and sixty-seven millions) of cubic feet *more* than was lifted for the pyramid, and yet the English work was performed by about 20,000 men only, in less than five years.

Every one has read Sidney Smith's celebrated description of the universality of taxing in great Britain, the price every man is daily compelled to pay for the aggregete national glory of centuries. Had he lived to the present day, the progress since made in the arts of life would more than have doubled his catalogue of taxables. In that country every process in nature that ministers to mans comfort, every expression of his thoughts, every invention of his ingenuity, every exercise of his freedom, every thing that supports life, or that even makes it tolerable is taxed to support the enormous superincumbent structure, which, like some hideous excressence of the human body grows more and more rank just in proportion as it is required to oppose any resistance to its progress. The following table shows the revenues derived to government railroads in that country:

	Government Duty.	Rates and Taxes.	Aggregate T.
London and North Western	$252,525	292,245	544,770
Great Western	148,015	192,775	340,790
Midland	115,215	165,625	280,840
Eastern Counties	84,085	123,770	207,855
London and Brighton	81,880	114,170	196,050
London and S. Western	75,165	97,455	172,620
South Eastern	74,475	111,835	186,310
York and North Midland	35,460	69,800	105,260
York, Newcastle, and Berwick	33,355	72,065	105,420
Lancashire and Yorkshire	21,680	83,965	105,645

The article referred to urges strenously the passage of Lord Monteagle's bill, which has for its object the creation of an official department, to see that the receipts and expenditures are properly classified and explained in the books and accounts, for the information of the proprietary, and that a form of accounts, in certain heads of expenditure are given. It also advocates the purchase by government and the consolidation of all the roads into one general system, to be directed and controlled by the state. This, which is a popular doctrine in Great Britain, would be rank heresy here. There is a continually growing feeling with us, to divestt government of all its powers not absolutely necessary to carry out the great objects for which it was instituted. The tendency of all power is to strengthen itself, irrespective of popular rights. We guard against its abuse by giving to our rulers only so much authority as is absolutely necessary to carry out their several functions. Power, which in other countries is represented by the government, with us resides with the people, which effectually prevents its concentration in particular hands to be used as the instrument of selfish purposes. We pay our officers as we do our workmen that build our ships or houses, according to the value of their labor. Every one feels, therefore, that he is not unreasonably taxed, and this burden he bears as cheerfully as any other necessary expenses he incurs. Every one sees that government is worth to him it all costs. Consequently it has the support of his convictions, as well as his prejudices. This is the great secret of the strength of our government, and of the order and quiet of our people. In Europe the subject feels that government is worth but little and that it costs every thing, that he gets no equivalent for what he contributes to its support, but that all is squandered to sustain in luxury and dissipation those possessed of power, or to strengthen the bonds by which they hold their fellow men in oppression. Hence the disatisfaction and desire of change which we every where witness in Europe. If John Bull makes better railroads we are certainly setting him an example in the ecomomy of government.

The following table presents a general view of the railway system in Germany:

Names of the States.	English miles constructed.	English miles in project.	English miles to be constructed.	English miles Total.
Austria	716½	229	158½	1103
Prussia	677½	403	794	1874
Duchy of Anhalt	39½	12½	——	52
Kingdom of Saxony	176	148	7	331
Duchy of Saxe	137½	43½	87	144
Bavaria	149	308½	174½	632
[illegible]	[illegible]	146	32	204
Grand Duchy of Baden	154½	35½	——	195
Do. of Hesse Darmstadt	34½	43½	40	118
Duchy of Nassau	27	——	——	27
Francfort-on-Main	2	14	——	16
Electorate of Hesse	"	178	4	182
Duchy of Brunswick	73	——	7	80
Hanover	59	154	161	374
Hanseatic Towns	9	——	2½	11½
Grand Duchy of Mecklenburg	46	——	94½	140½
Holstein and Lauenburg	96	31	43½	170
Total	2294	1748½	1595½	5637½

The total number of miles thus projected in all Germany is not much greater than the number now executed in England.

The lines of railway in other parts of Europe are given below:

The lines in Belgium constructed by the State amount to 347 miles, and cost £5,945,148. They unite Brussels with Ostend, Bruges, Ghent, Antwerp, Malines, Courtray, Lille, Tournay, Douay, Valenciennes, Mons, Charleroi, Namur, Marienbourgh, Liege, and Aix-la-Chapelle.

In Holland there are railways joining Amsterdam and Rotterdam, 50 miles; and with Utrecht and Arnheim, 60 miles.

In the North of Italy, a line partly finished passes from Venice to Turin and Alessandria, by Vicenza, Brescia, Milan, and Novara; and one from Milan to Monza. There is also a line from Florence to Leghorn through Pisa, and to Pontedera; another from Pisa to Lucca and St. Salvatore, and another from Florence to Prato.

In the south of Italy, there is a railway from Naples to Pompeii and Castellamare, and another from Naples to Caserta and Capua; but no line has been projected in the States of the Church. The Pope, indeed, is said to have objected to their introduction.

There is a railway in Switzerland twenty-five English miles in length from Zurich to Dietken and Baden; and even in Spain, a railway 17½ English

miles in length has been recently opened from Barcelona to Mataro.

The most eastern railways in Europe terminate at Warsaw and Cracow. A line is in progress to Bochnia, east of Cracow, and another from Pesth to Debretzin, still farther east.

AMERICAN RAILROAD JOURNAL.

Saturday, September 22, 1849.

Boston and Maine Road.

We have been favored with a copy of the annual report of the Directors of this corporation, submitted to the Stockholders, at their meeting held in Dover on the 12th inst. A large portion of the report is devoted to the correction of sundry statements made by the committee of investigation, and indeed the whole pamphlet may be considered rather as a general reply to the report of the committee.

In the commencement of the report the Directors give a statement of the progress made during the past year.

The Methuen branch, and the 9¼ miles of new road through Andover and Lawrence have been completed, and open for use. A double track has been finished from Boston to Reading, 12¼ miles, and one from Ballard Vale through Lawrence to North Andover, 7¼ miles; besides one from the junction of the Lowell and Lawrence railroad to the northerly part of Lawrence, making it in all about 21 miles of double track between Boston and North Andover, including Lawrence. The freight house in Dover, which was burned the last season, has been replaced, and expense charged to repairs. A brick freight house at Salmon Falls, another at South Andover, a station house at Salmon Falls and one at Ballard Vale, have been built during the last year The bridge which was destroyed by fire at Salmon Falls in January last, has been entirely rebuilt, and is now one of the most perfect structures on the line of the road. It is 550 feet long; the foundation of the masonary are carried down to the solid rock; and the superstructure is finished so as to be entirely water proof. The new bridge has cost about $18,000; the old one was built at an expense of about $20,000. The loss by the destruction of the car shop at Lawrence (August 15th,) is supposed to be about $40,000.

The directors state, that from the opening of the road to Dover in 1841, to December 1847, there was an *annual* and regular increase in its business of 33 *per cent.*, till its gross receipts for the last mentioned year amounted to over half a million of dollars.—In view of this and the prospective increase of business, the fares and freight charges were reduced about 14 per cent; but for various reasons which have operated on all railroads, a *comparative* reduction of business and travel took place. In the meantime large expenditures were making by the corporation, in preparation for the business expected from Lawrence and other quarters, in accordance with the approval of the stockholders. In addition to thes untoward circumstances, the losses by fire at Salmon Falls and Dover, had their influence to prevent an increase of the *net income*, to correspond with the increased means and expenditures. Notwithstanding all these diadvantageous circumstances, the *net earnings* of the road, for the two years ending June 1, 1849, have been an average of 8 per cent, per annum, and for the worst twelve months of the time, the last year, the *net income* was fully 7 per cent.—This is considered a satisfactory result in view of the severe trials to which the road has been subjected.

The report then alludes to the recent action of the legislature in relation to the bridge over Charles River, by which the privilege given in 1848 to another company, to use the bridge of the Boston and Maine road over this river, has been superseded.—A few brief remarks are then made in justification of the extensive expenditure made in the construction of branches, etc., which seem very satisfactory. The directors then come to the consideration of the report recently made by the committee of investigation. For the satisfaction of our readers we give the following copious extracts from the reply of the directors:—

The Committee of Investigation have animadverted, with a good deal of emphasis, upon the shops and the building of cars and engines by the company. There may have been some error in so great an addition to the company's means at the time that the Lawrence shop was built. But the history of our own road, as well as that of many others, proves the great convenience and want of economy, in depending entirely on others for the running furniture of a railroad. This company early commenced the building of its own cars; and undoubtedly made a very considerable saving by so doing. There was a time when we could neither purchase at a reasonable price, nor build—with the means which we had and as fast as we needed—the cars to meet the requirements of the road. There may be a state of things in which it would be expedient for railroads to do much less in the way of building their own cars, than under other circumstances, It is by no means a settled question, however, that, as a matter of *economy*, railway corporations, as extensive as this and its connections, should not build their own cars.

We cannot refrain from adverting to another view of the subject of somewhat greater importance than that of the mere cost of this apparatus in the beginning. And this we do, without meaning to reflect upon the respectable car builders in Massachusetts. If we have this running furniture built in our own shops, we may be able to know the character of the materials used; indeed, there will be in comparison to the whole, that portion of the machine on which the safety of the passengers depends, any inferior work. This view of the subject was forcibly presented, a few days since, by a gentleman in our cars, a constant patron of the road. He remarked, "I shall ride on this road with much less of a feeling of security, when the company cease to build their own cars."

The fixtures and furniture of the shops have required a large outlay. Previous to the fire at Lawrence, this whole establishment, with all its apparatus, was believed to be quite ample to the exigencies of the road, for some years to come. There may have been some misjudgment as to the *extent, at this time*, of these additions to the company's means in this department. It is to be remarked, however, that the Boston and Maine railroad is—besides its branches—50 per cent. longer than any other railroad connecting with Boston; and promises as great a proportionate increase to its business, from tributary roads, and from the growth of establishments along its main line, as any other road. A comparison of the cost of its whole amount of buildings and fixtures, with those of the other railroads connecting with the city of Boston, is far from showing an extravagant outlay in these particulars on the part of this road. And a comparison of the expenses of its management with those of other roads, does not afford a presumption that, in the administration of its general affairs, there has been waste, improvidence, or neglect.

If we compare the cost of stations, buildings and fixtures' on the Boston and Maine railroad with the cost of the same items on the Fitchburg, Old Colony, Boston and Lowell, and the Eastern railroads, we shall find the average cost of these items on the four last mentioned roads, (in proportion to their length,) has been over 50 per cent. greater than that of the Boston and Maine. [We would have included in this comparison the Boston and Providence and the Boston and Worcester, if these items had been given in their returns.]

If we compare the *entire cost of building and furnishing* the Boston and Providence, the Boston and Lowell, the Boston and Worcester, the Fitchburg, and the Eastern Railroads, with that of our own, we shall find that the average cost per mile, of these five roads, is 30 per cent. more than that of the Boston and Maine.

The expense of *keeping in repair the engines and cars* of the Boston and Maine railroad, for the year 1848, was 10 per cent. less than the average of the other five principal railroads connecting with Boston, viz: The Boston and Providence railroad, the Boston and Worcester, the Boston and Lowell, the Fitchburg, and the Eastern. And if we except the Fitchburg, which had run about three years at the time taken for this comparison, and whose furniture must have been nearly new, we have the average charge for this item of expense on the other four roads, 19 per cent. greater than the same item of expense on the Boston and Maine road, the proportion to the miles run.

If we compare *the general expenses* of these five roads, with those of the Boston and Maine for the same year, we shall find that the average expense per mile of maintaining and running these five roads, is (as before) 10 per cent. greater than that of the Boston and Maine. And if, as in the other case, we leave out the comparison the Fitchburg railroad, whose track, bridges, &c., as well as the running apparatus, could have required much repair during the time—we shall find that the average expenses of the other *four* were 18 per cent. *greater* than those of the Boston and Maine. These comparisons are deduced from the official returns made by the Directors of the roads severally, and some of these are only approximations to a strict analogy, though they speak a general truth.

It may be remarked of these five railroads, there is only one whose expenses are less per mile than those of the Boston and Maine. And the comparative smallness of the expenses on that road, is accounted for, not only from the fact that the road and its equipment were comparatively *new*, but from the additional fact that the branches which were run by this road, were kept in repair by their own corporations.

It is also worthy of remark, that of these six roads, there is only one without ample car and engine [illegible] ours; this road depends mainly upon And the expenses of maintaining considerable repairs. ratus on that road, for the time taken for the above comparisons, were *much greater* than those of either of the others.

Some errors have crept into the report of the Investigating Committee, partly from the subject being new to them, and partly from the unintentional failure of the officers of the company to furnish every necessary explanation; though they were desircus so to do. But, from misapprehension of what was wanted, and of the object of the Committee in some of their inquiries, omissions and mistakes have occured, through the books and files of the company were placed at the disposal of the committee, and such explanations as were supposed to be necessary were readily given. But as the Directors and officers of the road did not see the report till after it was printed, they had no opportunity of correcting any mistake or misapprehension.

On the 37th p. of the report, the committee have stated the expense of labor and materials charged to the Boston shop for the 18 months ending June 1st, 1840, at 130,965 04
and at the Lawrence shop for the same period, at 115,656 16

amounting in the whole to 246,621 20

The Treasurer's books give us the following additional information with regard to this subject:

On November 30th, 1847, the stock on hand in the engine shop was.....	$11,817 77
Materials and labor charged for the 18 months ending June 1st, 1849.....	130,290 13
Amounting to.....	$142,107 90
Deduct stock on hand, June 1, 1849...	19,005 64
Balance against engine shop for the 18 months ending June 1, 1849.....	123,102 27
On the 30th November, 1847, the stock on hand in the car shop was.....	22,778 36
Materials and labor charged for the 18 months ending June 1, 1849.....	115,327 02

Amounting to	138,105	38
Deduct stock on hand July 1, 1849	22,679	14
Balance against the car shop, for the 18 months ending June 1, 1849	115,426	24

RECAPITULATION.

Balance against engine shop	123,102	27
" car shop	115,426	24
Amounting to	$238,528	51
The committee's statement of the balance against the two shops was	246,621	20
Over statements of committee	8,092	69

In the statement of what should be credited to the shops, the following amounts were omitted, viz:

Work done for repairs of road in Massachusetts	915	51
Work done for repairs of road in N. Hampshire	1,031	74
Work done for repairs of road in Maine	278	03
Work done for depots in Massachusetts	174	63
Lawrence machine shop, (for boilers, machinery, &c)	5,467	61
Under statement of cost of new engines and cars	3,318	43
	$11,185	95
To the above omissions, add the over statement of amount charged to the shops, for labor and materials as above	8,092	69
And we have here the sum of	19,278	64
which is to be deducted from the	24,254	89

stated by the committee on p. 41, as being the cost of the general repairs of engines and cars, for the six months ending June 1, 1849.

Leaving that cost only	$22,976	25

In justice to the committee, it should be stated that a part of the above error was occasioned by the returns made to them, not including every thing which properly should be credited to the shops, as the object of the committee in making the information, and the use for which it was—it will be perceived however, that the above correction exhibits the whole subject of the shops under quite a different *phase* from that contemplated by the committee, as it reduces very nearly one-half the charge against these establishments, as arrived at on the 41st page of their report.

The Directors exceedingly regret that this error occurred, or that it could not have been corrected before the report was printed. It changes so entirely the whole aspect of the case, that the committee would have probably been induced to qualify, if they did not entirely omit, the three or four following pages of their report."

We have given the above as the most important part of the reply to the Investigating Committee; but the directors take up in detail the several points which came under the animadversions of the committee, and make out upon the whole a very good case. In regard to free passengers, the directors show that no cause of complaint exists, and give the following statement of their character, and the relative number carried over any part of the road during the month of August, 1849:

Directors	115	passages.
Families of Directors	33	"
Employees	1119	"
Contractors, includtng Stage Drivers, &c	574	"
Others	35	"
	1876	

This statement shows a curtailment in the free list made since May, 1849, of 3140, the number in that month having been 5016. This reduction was made by the action of the directors, previous to the appointment of the committee. They wind up this subject with the following paragraph:

"On no other railroad leading from Boston, is the limitation of free passengers so strict as on this road—this has been ascertained by actual inquiry. The Directors are fully of the opinion that the privilege of free passage should be closely restricted to as few persons as possible, consistently with the interests of the road."

As we gave a large part of the report of the committee of investigation, we have in consequence made copious extracts from the report of the directors. We congratulate the company that every thing has turned out so well, and that all parties in this road seem so well satisfied. The report of the committee of investigation was unanimously accepted, "with a will," though it reflected severely upon the directors. At the annual meeting the old board was re-elected, and the two retiring members complimented for their very valuable services. The committee of investigation were thanked for their disinterested services. The investigation showed, that if the stockholders were not so rich as they once supposed themselves to be, that their property was nearly as valuable as it ever was. The election of the old board proves that the road has not been very badly managed, to say the least, and the result of the investigation will not only correct the mistakes that have been made, but secure a better state of feeling among those interested.

The following gentlemen constitute the board of Directors for the current year:

John Howe,
Sam'l. A. Walker,
James Hayward,
John Flint,
Andrew Pierce,
Samuel Batchelder,
George H. Kuhn,

Mr. Howe succeeds Mr. West as President of the company.

Boston, August 6th, 1849.

E. M. Stillwill, Esq.,

Dear Sir—We have already put down one of Tyler's patent safety switches, and are preparing to put down several others. I am satisfied that it is the best thing of the kind I have ever seen. It answers the purpose remarkably well, and I think it generally adopted by railroads it will save a good deal of money, by preventing accidents in running off at switches. One great merit of this switch is its simplicity, and the certainty of both tracks always being left whole, even though the switchman is remiss in his duty. It likewise is so constructed as to require no alteration in any of the machinery for operating the road. It does not interfere in the least, with snow ploughs, cow catchers, or scrapers. I can with confidence recommend it as a valuable invention.

Yours respectfully
S. M. Felton.
Supt. Fitchburg Road.

We have conversed with a number of the superintendents of the leading railways running into Boston, who are putting down this switch, and who gave it as their opinion, without hesitation, that no road can be considered in proper running order without using it, and that none can be excusable for accidents occuring from misplacement of switches unless this is used, and that the omission to adopt it, is alone sufficient reason to make companies responsible for any accident that occurs.

The Hudson River Railroad is now in running order to Peekskill.

☞ We invite attention to the advertisement of Messrs. Lee & Blanchard, Philadelphia, of valuable scientific works published by the m.

New Hampshire.

The receipts on Cheshire Railroad for August exceeded $18,000, an increase of $3000 on the proceeding month. The cattle train, on Thursday evening, consisted of 71 cars of cattle and sheep. There were also about 30 cars of other freight from the North, making over a 100 cars.

The friends of the Ashuelot Railroad met at Keene on Tuesday. The President announced that a vacancy in the Board of Direction had been filled by the election of Philip Ripley, Mayor of the city of Hartford. The contract for a lease of the Ashuelot Road to the Connecticut River Railroad Company, "on terms that shall secure seven per centum per annum for ten years on the investment of stock in the Ashuelot Railroad Corporation," was approved and confirmed, and additional stock to the amount of 10,000 dollars was taken.

Novelty Iron Works.
New York, August 5th, 1849.

Horatio Allen, Esq.,

Dear Sir—On a careful perusal of "Mushet" on "Shrinkage and expansion of Cast Iron" I am surprised that one having possessed the advantages which were at his command, should betray such inconsistency with his own principles: which are,

1st. "That cast iron when fluid is more dense than in any other state."

2nd. "That immediately upon its passing from the fluid to the solid state, it acquires its greatest volume."

In illustration of these principles, he says "several pieces of iron may be put into a ladle and hot iron poured upon them, they will immediately rise to the surface and expose a considerable portion of their bulk above the surface of the liquid iron. This buoyancy diminishes and as the pieces of metal approach more and more to the state of fusion that exists in the ladle, they gradually sink till they disappear entirely under the surface."

It will be conceded that the foregoing is a statement of facts, and that it apparently affirms the 1st of Mushets propositions, but unfortunately for him, it clearly negatives the 2nd, for he admits the deminution of buoyancy of the pieces of iron, at the very point at which it should be increased, viz., at the point of its largest volume.

Another illustration is given by filling a gun mould with fluid iron:—"we find, when cold, that the piece of casting has shrunk interiorly, has diminished in point of length, and has lessened its diameter."

The *rationale* of this he gives as follows:—

1st. "Their shrinkage appears to be dependent on two causes, the gravitation of the fluid metal, and the expansion of the mould. The latter I conceive acts a very powerful part; the immense quantity of caloric combined with the iron is in part easily and almost instantaneously communicated through the sand to the iron box. This creates a disposition to expand, in which it is greatly assisted by the great pressure of fluid iron. That portion of the metal in contact with the interior of the mould is the first to lose its fluidity, and is acted upon and forced to give way in the same ratio of expansion before the subtle and denser fluid. The diameter of the shell of the gun is at this period increased in every part; the fluid iron in the interior descends to occupy the enlarged space, and the head of the gun presents an increasing chasm like the concave of a sand glass."

"In proportion as the cast iron resolves itself into a solid, a diminution of pressure should take place upon the mould. This would inevitably follow were not its force replaced by the increased volume of the metal passing into a solid state, which is equivalent to that law which I have termed—

2nd expansion—"Of the extent of this operation

we may judge from the following facts: all patterns of castings are made somewhat larger than the piece of goods is wished to be; in common cases 1-8 of an inch to the foot is allowed, but in many cases the allowance will be nearly 3-16 of an inch. In the case of the gun therefore the mould would be, plus the allowance upon the pattern, what space was gained by beating the pattern to loose it from the sand, and all the extra space acquired by the increased volume of the consolidating iron. These taken collectively may amount to ¼ or 5-16 of an inch, and so much less will the diameter of the gun be found when cold, to what it would have measured at the climax of its expansion."

"3rd., contraction immediately takes place of the metal ceasing to expand. To its effects are chargeable the reduction of the increased diameter of the gun, and which seems merely in consequence of the escape of caloric."

Now it appears to me that this case positively conflicts with both propositions, for if the casting when cold is found to be so considerably smaller than was the mould which was filled with fluid iron, it is beyond peradventure more dense in the former state than in the latter, consequently the first propositions is negatived.

As to the interior shrinkage it should not have existed if the 2d., proposition is true, for after the exterior of the casting had congealed it could not yield to the expansion of the remainder without bursting, and so long as there was room for this expansion interiorly, we could not reasonably look for such a consequence but, to the contrary, the entire closing of the shrinkage would be inevitable.

Yet another example he gives in the casting of shot in an iron mould. He says, "the mould is always filled by the shot till cooling has so far taken place as to reduce the shot mould to its former diameter. Beyond this however the shot still continues to lessen its bulk, so that when cold it will be found to have left its mould by nearly 1-66 part of its diameter." If this does not prove iron to be more dense when cold than when fluid I do not know from whence proof can come.

To a part of this work already quoted, as follows "all patterns of castings are made somewhat larger than the piece of goods is wished to be," the question may be addressed, why the necessity of this if iron when cold is not smaller and consequently more dense than when fluid?

Thus far I have not gone beyond the writers examples, I will now endeavor to strengthen my objections to his theory by some observations of my own.

In preparing the mould for a hydraulic cylinder weighing about eight tons, recently cast under my direction, great care was taken in selecting loam with a large proportion of clay—and a sand of established character for resisting vitrification. With this mixture a strongly built brick wall of eight inches in thickness was coated. When thoroughly dried, the mould was carefully measured and transferred to the casting pit. Here strong boiler iron curbs were encircled about it at the distance of eighteen inches. The intervening space was filled with sand very closely pounded. When thus prepared, the estimated strength of this mould was sufficient to resist fourfold the gravitation required; and upon it caloric would exert very little if any expansive force.

In a few moments after the mould was filled a gradual sinking of the fluid iron was observed in the feeding head which was supplied with other iron very hot. This process continued four hours, at the end of which time the mould had received in addition to its first filling 264 pounds or 1,016 cubic inches of iron.

Upon measuring the casting, when cold, it was found to be 687 cubic inches smaller than the mould in which it was cast.

The result of these experiments presents insuperable difficulties to the admission of Mushets theory, for it is impossible, on the commonly received principles of gravitation, that the iron when first poured into the mould should be more dense than after it had resolved itself into a compass diminished 687 cubic inches, with an increased weight of 264 pounds.

As to expansion, I can see no room for it, whatever, for the mould certainly could not yield to it, and the result must have been as before noticed in the gun. I find thrown in by the way of a passing remark "that melted cast iron supports lead and tin." This assertion is so visionary that I am at a loss to determine whether the writer is in earnest or not. As well might he, with the hope of being believed, tell us that water will support a flint stone.

I close this communication with the remark that my only endeavor has been to show the fallacies of Mushet, without attempting an elucidation of this difficult subject, which I confess is quite beyond my ability.

I think Sir, in this I have succeeded, and conclude with the assurance that the phenomenon of solid iron floating upon liquid remains yet unexplained.

I remain Dear Sir,

Your Obedient Servant

N. M. STRATTON.

We have permission to publish a copy of the above letter, which we give without comment of our own, only expressing a desire that it may lead to a discussion which shall solve the apparent contradiction of principl[illegible] ved, in relation to the action of heat in enlarging the area of bodies.

Savannah Georgia September, 13, 1849.

H. V. POOR, Esq.,

Dear Sir—I have been induced by the perusal of an article in your valuable Journal of the 8th inst., to mention a few suggestions on the subject of a railroad from the Missisippi river to the Pacific.

Three facts seem to be self-evident in connection with this subject: first that public opinion demands that a road should be commenced; secondly that no individual or association can build the road without the aid, (direct or indirect) of the general government; and thirdly, it is a scheme of such vast importance that no sectional feeling should have any weight in the selection of the route.

As a starting point for the Eastern terminus I would propose Fort Smith; and for the following reasons among others: it would remove all constitutional objections which many members of Congress would have to any location within a State—it can be approached by water now at nearly all seasons of the year, with the *largest* boats, and therefore save the cost of building the road to that point.—If a road should start from St. Louis, or the Ohio, it would necessarily pass near Fort Smith, provided it passed over the mountains to the valley of the Gila; and as I believe that to be the best, shortest and cheapest route, I have but little doubt but that route will be selected. Roads could be eventually built, from St. Louis, Memphis, Vicksburg or New Orleans to Fort Smith, but at present, all could be accommodated by steamboats and thus several millions of dollars immediate expenditure, could be saved.

From Fort Smith the road would pass up the south side of the Canadian river; and as there would be no large streams to cross for 4 or 500 miles, this would save the expense of bridges, which would be the most costly part of the road on account of the scarcity of timber, and great distance from all localities where mechanical labor can be procured. I think the first four hundred miles from Fort Smith would not cost more than $15,000 a mile, as the country is represented to be an open prairie almost level. The route would pass one or two hundred miles south of Santa Fe: and the fertile valley of the Rio Grande would furnish subsistence for the laborers on the road.

After passing the Rio Grande, the road would of course be expensive, but not as much so as a more Northern route; as the laborers could work the whole year; while the work on the route from St. Louis by the south pass, would be interrupted for a long time each year by snow. Following down the Gila would again avoid bridging; and though I would propose San Francisco as the western terminus; to be approached by the valley of the San Joachim, I would have the road or a branch built to the point where the Colorado could be navigated by steamboats; and thus secure the trade of the Gulf of California and all the western coast of Mexico down to Acapulco. As this route would approach nearer to Chihuahua than any other, the trade of that important city, in fact of all the States of Northern Mexico, would be secured for ever to this road.

The distance from Fort Smith to San Francisco, *for a located line* would not probably exeeed 1700 miles; and this must be shorter than any other route. I believe the road can be built for one third of the cost of a road by Mr. Whitney's route, or two thirds route is the shortest south pass route. Now if this control more trade and business than any other, will one at the same time that can have *no sectional* or *constitutional* objections, would it not be for the interest of all to unite upon it, and have the question of route settled; and then have all future exertions directed to the raising of the means to build it. I believe Congress would more willingly vote money to build the road, then to give Mr. Whitney a grant of an extent of domain, larger than many kingdoms in Europe. The proceeds of the sales of public lands for five years, would probably be as large an amount of money as could be profitably expended; and by that time the whole people would look upon it as a great national measure which every one would be proud to aid by all the means in his power. If there should be any doubt about the proper expenditure of the appropriations, a board of commissioners might be appointed, say seven, one to go out each year, not to be eligible for re-appointment, after holding the office three years.*

We fully agree with the writer of the above, that the time has come when our people demand a railroad to the Pacific—that no individual or company can build it without the aid of government, and lastly that the selection of the route should be entirely uninfluenced by sectional or party interests; but for the best of reasons, we can by no means so readily answer the questions, how shall be provided the means for its construction, where shall be the western terminus, or by what route shall it be reached?

The solution of the two last depends upon evidence within our reach; but not yet developed.—The western terminus shall be the point best fitted

to be the commercial centre of our Pacific possessions. San Francisco is undoubtedly our best harbor on this coast; while it is equally clear, that it can never be the ultimate centre of population west of the Rocky Mountains. The question of terminus must, however, depend mainly upon that of the route; and this can only be determined by mathematical survey. The physical characteristics of the country must decide this point. As San Francisco is at the present time, and must for many years continue to be, by far the most important port on the Pacific, we have no doubt but this will be selected as the terminus of the road if a favorable route can be found in that direction; and if the means by which the road is to be built are equally applicable to this as any other route.

In deciding the question of route and terminus, we must expect great diversity of opinion, but these differences must yield to the existence of certain facts in their nature demonstrable. But when we come to the discussion of means we have no such guide, and the soundness of any particular plan can only be demonstrated by the results. This is a question in which every man thinks himself as wise as his neighbor, and as no facts exist by which the absolute correctness of any particular views can be tested previous to commencing work, we may here expect to encounter the greatest obstacle to the commencement and successful progress of the road. The examination and discussion of this branch of the subject may yet elicit a plan, which may be generally acceptable, and secure the completion of the work. As yet we have met with no "matured" plan which we can approve. The one which originated in Boston, requires too much governmental aid for what is to be a private work. By that plan government is to assume almost the whole expense of the work, and must incur the loss in case of failure while individuals reap the gain. We will never consent to place the amount required in the hands of private persons, to be expended under their direction. Apart from mere prudential consideiations, there are in our minds other insuperable objections to it. We have already examined Mr. Whitney's plan at some length. Instead of being a plan to build the road, the direct tendency of it is to defeat it. Mr. Whitney gives no guarantee that he will build it; and as his means constantly diminish, and his expenses increase, as he progresses, there must certainly be a point where it is against his interest to go any further. Where there is no obligation imposed we must conclude that his interest will regulate his conduct. If so he would never build the road. If we are not so sanguine as to the early completion of the work as some others, it is only we think, because we more carefully consider the difficulties to be encountered. We must bear in mind the repeated failures of some of the richest States in constructing public works of infinitly less magnitude with all the aid and facilities, furnished by abundance of skill, labor, and even capital. We cannot now appreciate the difficulties to be encountered in this great work. Still we must commence and complete it, and the sooner, as a people we thorougnly examine it in all its bearings, the sooner we shall be prepared to act, and the greater the probability of our acting right.

Glendon Refined Iron.

Round Iron, Band Iron, Hoop Iron,
Square " Flat " Scroll "
Axles, Locomotive Tyres,
Manufactured at the Glendon Mills, East Boston, for sale by GEORGE GARDNER & CO.,
5 Liberty Square, Boston, Mass.
Sept. 15, 1849. 3m37

Pennsylvania Railroad.

PROPOLALS will be received at Johnstown, Cambria county, Pa., between the 1st and 12th of October next, for the Graduation and Masonry of that portion of the Western Division of the *Pennsylvania Railroad* east of Section No. 54, opposite Blairsville—a distance of 26 miles—embracing a considerable am't of heavy excavation and embankment.

Plans and specifications of the work may be seen at the office, in Johnstown, within the periods above mentioned.

For further information apply to Edward Miller, Esq., Engineer of the Western Division, Summit P. O., Cambria county, J. EDGAR THOMSON,
Chief Engineer and General Superintendant.
Engineer Department P. R. R. Co.,
Philadelphia, Sept. 6, 1849.

To Steam Engine Builders.

THE Undersigned offer for sale, *at less than half its cost*, the following *new machinery*, calculated for an engine of 62 inches cylinder and 10 feet stroke, viz:

2 Wrought Iron Cranks, 60 inches from centre to centre.
1 Do. do. Connecting Rod Strap.
2 Do. do. Crank Pins.
1 Eccentric Strap.
1 Diagonal Link with Brasses.
1 Cast Iron Lever Beam (forked).

The above machinery was made at the West Point Foundry for the U. S. Steamer Missouri, without regard to expense, is all finished complete for putting together, and has never been used. Drawings of the cranks can be seen on application to

HENRY THOMPSON & SON,
No. 57 South Gay St., Baltimore, Md.
Sept. 12, 1849.

Illustrated Scientific Works.

LEA AND BLANCHARD, Philadelphia, publish the following important works on various branches of Practical Science. They will be found exceedingly low in price, while their mechanical and typographical execution are of the best kind.

I.

Principles of mechanics applied to machinery and engineering by Julius Weisbach. Translated by Professor Gordon of Glasgow, and Edited by Professor Walter R. Johnson. In two very handsome octavo volumes, with 872 illustrations on wood.

[illegible] U. S. N. Engineer in Chief.

The design of the author in supplying the instructor with a guide for teaching, and the student with an auxiliary for the acquirement of the science of mechanics, has, in my opinion, been attained in a most successful manner. The illustrations, in the fullness of their construction, and in typographical execution, are without a parallel. It will afford me much pleasure to recommend its use by the members of the profession with which I am connected.

This work is one of the most interesting to mathematicians than has been laid before us for some time; and we may safely term it a *scientific gem.—The Builder.*

The most valuable contribution to practical science that has yet appeared in this country.—*Athenæum.*

Unequalled by anything of the kind yet produced in this country—the most standard book on mechanics, machinery and engineering now extant—*N. Y. Commercial.*

In every way worthy of being recommended to our readers—*Franklin Institute Journal.*

What the "Mechanique Celeste" is to the astronomer, a treasury of principles, facts, and formulæ on which he may draw on almost any and every occasion, that can be conceived to arise in the field either of demonstration or operation—*Methodist Quarterly Review.*

II.

Technology, or chemistry applied to the arts and to manufactures. By D. F. Knapp, Translated by Drs. Ronalds and Richardson, and Edited by Professor Walter R. Johnson. In two very handsome octavo volumes, with 460 illustrations on wood.

One of the best works of moderate times.—*New York Commercial.*

We think it will prove the most popular, as it is decidedly the best of the series. Written by one who has for many years studied both theoretically and practically the progress which he describes. The descriptions are precise, and conveyed in a simple unpretending style so that they are easily understood, while they are sufficiently full in detail, to include within them everything necessary to the entire comprehension of the operations. The work is also carefully brought down to include the most recent improvements introduced upon the continent of Europe, and thus gives us full descriptions of processes to which reference is frequently made in other works, while many of them are we believe, now for the first time, presented in a complete state to the English reader.—*Franklin Institute Journal.*

In addition to the valuable scientific matter contained in the original work, very extensive American additions have been made to it by the editor, which are exceedingly valuable, and of much interest to the general reader. The publishers have spared no pains in bringing out a work of superior mechanical execution and rare excellence, with numerous skilfully engraved cuts, designed to illustrate the various subjects treated in this work. We feel confident that, as a truly useful publication, it will be eagerly sought after and highly appreciated.—*N. Y. Farmer and Mechanic.*

III.

Principles of Physics and Meteorology, by Professor J. Muller, Edited with additions by R. Eglisfeld Griffith. In one large octavo volume, with 550 wood engravings and two colored plates.

This is a book of no ordinary or ephemeral value.—It is one of a series, now republishing in London, on the different branches of science, which from its thorough character and extended range, is much needed in this country. Its design is to render more easily accessible an extensive knowledge of the general principles of physics and meteorology; and the distinguished author has certainly realized the design to a wonderful extent. The subject treated upon are very numerous—statics, hydrostatics, dynamics, hydrodynamics, pneumatics, the laws of the motions of waves in general, sound, the theory of musical notes, the voice and hearing, geometrical and physical optics, magnetism, electricity and galvanism, in all their subdivisions, heat and meteorology. The size is nevertheless convenient—one handsome octavo volume, of six hundred pages—in clear, bold type, and profusely illustrated. In the execution of the illustrations we have rarely seen any thing equal to this American edition.—*N. Y. Commercial.*

IV.

Practical Pharmacy; comprising the arrangements, apparatus, and manipulations of the Pharmaceutical Shop and Laboratory. By Francis Mohr, Ph. D., and Theophilus Redwood. Edited with alterations and additions by W. Proctor, Jr. One very handsome octavo volume, with 506 engravings on wood.

We had scarcely finished a glance at the beautiful London edition of Mohr and Redwood's pharmacy, before Professor Proctor's improved edition of this fine technical treatise, was laid on our table by Messrs. Lea and Blanchard. This work is one which will at once find its place in every laboratory and pharmaceutical shop, and is well calculated to recommend new and improved methods of manipulation to both chemists and pharmaceuts. In the absence of highly appointed laboratories and of pharmaceutical instruction which is so general in this country, such works as the present are particularly valuable. The beautiful and abundant wood cuts which adorn almost every page of the book, enter the descriptions of apparatus perfectly plain, and its reconstruction easy even by the tyro. Professor Proctor has long been known to pharmaceutical readers in this country, as the author of numerous and important researches in the Materia Medica, and his additions to the present edition of Mohr and Redwood are frequent and valuable.

The American Journal of Science and Arts.

V.

The Young Millwright and Millers Guide; Illustrated by Twenty Eight Descriptive Plates, by Oliver Evans. Twelfth Edition, with additions and corrections, by Thomas P. Jones, with a description of an Improved Merchant Flour Mill, with Engravings, by C. and O. Evans. In one volume 8vo., with 110 figures on twenty eight plates.

ALBANY AND BUFFALO RAILROADS.—Four Trains daily, Sundays excepted, viz:
Leave Albany, 6 a.m., 9 a.m., 2 p.m., 7 p.m.
Reach Buffalo, 15 hours, 18 hours, 23 hours, 18 hours.
Arrive from Buffalo, 7 p.m., 2½ a.m., 12½ m., 3½ p.m.

Passengers by the *Express Train* reach Buffalo from New York, and New York from Buffalo, in 24 hours. The Isaac Newton and Oregon connect at Albany with this Train. Baggage cars, with careful baggage masters, run through with all the trains.

For Schenectady, Saratoga Springs & Whitehall,
Leave Albany at 7 a.m. and 2 p.m. For Schenectady only at 6, 7 and 9 a.m. and 12½, 2 and 7 p.m. For Erie Canal packets at 7 a.m. and 7 p.m. By Plank Road from Schenectady to Saratoga at all hours by stages, etc.

The *Eastern Trains* leave Albany at 7 a.m. and 3 p.m. The wagons of the company take baggage *free* between railroads and steamboats at Albany.

E. FOSTER, Jr., Sec'y
Albany and Schenectady Railroad Co.
Albany, August, 1849.

Large Wooden Pumps.

SEVERAL Large Wooden Square Pumps, of various sizes from 6 to 24 inches, and lengths from 10 to 25 feet, strongly bolted and strapped together with wrought iron; and used to great advantage on the Boston Water works; also two screw pumps each 25 feet long and 2½ feet in diameter, are now for sale by the Boston Water Commissioners.

For further particulars inquire at No. 119 Washington Street, Boston, or of E. S. CHESBROUGH,
West Newton.

June 8, 1849.

P. S. DEVLAN & CO's Patent Lubricating Oil.

THE Subscribers invite the attention of Railroads, Steamboats, Machinists, etc., to the above article of Oil; they are prepared to supply it in any quantity. Certificates of its superiority over all other oils, from several of the largest Works and Railroads, can be seen at our office. KENNEDY & GELSTON,
5½ Pine street, New York,

Sole Agents for the New England States and State of New York. 1y14

Steam Boiler Explosions.

THE Subscriber having been appointed sole Agent for Faber's Magnetic Water Gauge, is now ready to supply the trade, and also individuals with this celebrated instrument. Besides the greatest safety from explosion resulting from its use, it is a thorough check against careless stoking and feeding. In marine engines it will regulate the exact quantity required in the "blow off." Pamphlets containing full information, can be had free on application to the Agent,
JOSEPH P. PIRSSON,
Civil Engineer, 5 Wall st.

Journal of the Franklin Institute of the State of Pennsylvania, for the Promotion of the Mechanic Arts.

The oldest Mechanical Periodical extant in America, is published on the first of each month in the City of Philadelphia. It has been regularly issued for upwards of twenty-three years, and is now edited by a committee of scientific gentlemen appointed for the purpose, by the Franklin Institute.

The deservedly high reputation, both at home and abroad, which this Journal has acquired and sustained, has given it a circulation and exchange list of the best character, which enables the Committee on Publications to make the best selection from foreign Journals and to give circulation to orignal communications on mechanical and scientific subjects, and notices of new inventions; notices of all the Patents issued at the Patent Office, Washington City, are published in the Journal, together with a large amount of information on Mechanics, Chemistry, and Civil Engineering, derived rom the latest and best authorities.

This Journal is published on the first of each month, each number containing at least seventy-two pages, and forms two volumees annually of about 432 pages each, illustrated with engravings on copper and on wood of those subjects which require them.

The subscription price is Five Dollars per annum, payable on the completion of the sixth number; and it will be forwarded free of postage when five dollars are remitted to the Actuary (postage paid) in advance for one year's subscription.

Communications and letters on business must be directed to "the Actuary of the Franklin Institute, Philadelphia, Pennsylvania," the postage paid.

WILLIAM HAMILTON,
Actuary, F. I.

Engine and Car Works,

PORTLAND, MAINE.

THE PORTLAND COMPANY, Incorporated August 8th, 1846, with a capital of $250,000, have erected their extensive Works upon the deep water of Portland Harbor, and receive and transport, to and from their works direct, to and from vessels of any class.

They now manufacture to order, and deliver upon the Railroads running in each direction from the city, or on shipboard as wanted, Locomotive, Stationary, or Steam Boat Engines; Passenger, Mail, Freight, Earth and Hand Cars; Railway Frogs, Switches, Chairs and Castings; and every other description of Machinery. HORACE FELTON,
Superintendent.

JAMES C. CHURCHILL,
General Agent and Clerk.

The New York Iron Bridge Co.

LATELY KNOWN AS
Rider's Patent Iron Bridge Co.

THE Company which has hitherto furnished these Bridges, under the patent granted to the late Nathaniel Rider, deceased, have become satisfied that all the principles embraced in their construction, are included in a previous patent, granted in the year 1839, to Col. Stephen H. Long, of U. S. Engineers, and by him designated as "Long's Suspension Bridges," and have therefore made an arrangement with Col. Long, by which they have secured the exclusive right to make and vend these Bridges throughout the whole United States.

August 4th, 1849. M. M. White, Agent,
au7tf No. 74 Broadway, New York.

NOTICE TO

Superintendents of Railroads.

TYLER'S PATENT SAFETY SWITCH.—The undersigned would respectfully call their attention to his Patent Safety Switch, which from long trial and late severe tests has proved itself perfectly reliable for the purpose for which it was intended. It is designed to prevent the train from running off when the switch is set to the wrong track by design or accident. The single rail or gate switch is established as the best and safest switch for the ordinary purpose of shifting cars from one track to another, but it is liable to the serious evil of having one track open or broken when connected with the other. My improvement entirely removes this evil, and while it accomplishes this important office, leaves the switch in its original simplicity and perfection of a plain unbroken rail, connecting one track with the other ready for use.

The following decision of the Commissioner of Patents is respectfully submitted to Railroad Engineers, Superintendents, and all others interested in the subject.

P. B. TYLER.

(COPY.)

UNITED STATES PATENT OFFICE,
Washington City, D.C., April 28th, 1846.

SIR: You are hereby informed that in the case of the interference between your claims and those of Gustavus A. Nicolls, for improvements in safety switches—upon which a hearing was appointed to take place on the 3d Monday in March, 1846, the question of priority of invention has been decided in your favor. Inclosed is a copy of the decision. The testimony in the case [illegible]

Yours respectfully, EDMUND BURKE,
Commissioner of Patents.

To Philos B. Tyler.

Any further information may be obtained by addressing P. B. TYLER, Springfield, Mass., or JOHN PENDLETON, Agent, 149 Hudson St., New York.

34tf

Railroad Lanterns.

COPPER and Iron Lanterns for Railroad Engines, fitted with heavy silver plated Parabolic Reflectors of the most approved construction, and Solar Argand Lamps; manufactured by
HENRY N. HOOPER & CO.,
No. 24 Commercial St. Boston.

August, 16, 1849. 6m33

To Contractors.

BLUE Ridge railroad.—Proposals will be received by the undersigned at his Office in Brooksville, Albermarle county, Va., until the 1st of October next, for the construction of the tunnel through the Blue Ridge, together with the deep cut and embankment connected therewith at each end.

The tunnel will be 4,260 feet long, 16 feet wide and 20 feet high, with a ditch on each side: it will slope eastwardly at the rate of 66 ft. to the mile, and pass 700 feet below the top of the mountain.

Proposals will be received either for the whole or for one-half, it being distinctly stated, in this case, whether the Eastern or Western half is bid for.

Proposers are requested to examine the localities before bidding, and will obtain from the undersigned all necessary information.

The payments will be CASH, with a suitable reservation till the completion of the contract. The best testimonials and an energetic prosecution of the work will be expected,

Printed forms of proposals will be furnished on application to the undersigned.

By order of the President and Directors,

Proposals will also be received until the 15th of Oct. next for the *construction of the Railroad* on the Eastern side of the Mountain, about eight and a half miles. It comprises much heavy work and a Tunnel about 720 feet long.

C. CROZET,
Engineer Blue Ridge Railroad.

Brooksville, July 26, 1849,

Notice to Contractors.

OHIO AND PENNSYLVANIA RAILROAD.

PROPOSALS will be received at the office of the Ohio and Pennsylvania Railroad Company, in the town of Massillon, Stark county, Ohio, until sunset of Friday, the 28th of September, 1849, for the Grading and Masonry of the line between Canton and Wooster, a distance of about 32 miles. Proposals may be addressed to Wm. Robinson, Jr., President, or Solomon W. Roberts, Chief Engineer of the company.

Drawings and specifications of the work to be let will be exhibited at the office in Massillon, for a week before the letting, by Jesse R. Stranghan, the Resident Engineer of the Western Division.

By order of the Board of Directors.
WM. ROBINSON, Jr., President.

Pittsburg, August 11, 1849.

To Railroad Companies.

FOR SALE—A Second-hand Locomotive Engine and Tender, of about 10 tons weight, in good order, and *warranted to perform well.* Any company wanting a cheap engine for a passenger or light burden train, will rarely meet with an opportunity so favorable as the present. The engine and tender are in perfect running order, and will be tested to the satisfaction of any one wishing to purchase. Price $1,500.

Address J. B. MOORHEAD,
Frazer P.O., Chester county, Pa.

P.S.—The Engine can be seen by calling on H. Osmond & Co., Car-builders, Broad st., Philadelphia.

September 6, 1849.

Patents for Inventions.

THE Subscriber offers his services for the procuration of Patents in the UNITED STATES; in the CANADAS and other British Colonial possessions; in the SPANISH, FRENCH and other WEST INDIES.

ALSO IN EUROPE.

ENGLAND WITH COLONIES; SCOTLAND and IRELAND. FRANCE, BELGIUM HOLLAND, etc.

☞ The foreign patents are procured through special agents, established by, and solely responsible to this establishment. At this office may be obtained all documents required in patent business; *Deeds, Conveyances, Agreements, Assignments,* etc. Counsel given on questions involving points of law in Contested Cases, and written opinions, on the title claims, etc., of Patent is questioned.

MECHANICAL ENGINEERING.

Drawings of all kinds furnished to parties who wish to prosecute their own patent business. Accurate working drawings for Pattern Makers or for making Contracts with Manufacturers; calculations and drawings made, for constructing difficult and complicated machines or parts of machines. Draughtsmen furnished to take Drawings of Mills, Mill Sites, and Machinery, in any part of the country.

Pamphlets, containing full information on the above subjects, furnished gratis.

JOSEPH P. PIRSSON, Civil Engineer,
Offic, No. 5 Wall St.

ENGINEERS.

Arrowsmith, A. T.,
Buckfield Branch Railroad, Buckfield, Me.

Bancks, C. W.,
Engineer's Office, Southern Railroad, Jackson, Miss.

Berrien, John M.,
Michigan Central Railroad, Marshall, Mich.

Buckland, George,
Troy and Greenbush Railroad.

Clement, Wm. H.,
Little Miami Railroad, Cincinnati, Ohio.

Davidson, M. O.,
Eckhart Mines, Alleghany Co., Maryland.

Fisk, Charles B.,
Cumberland and Ohio Canal, Washington, D. C.

Felton, S. M.,
Fitchburgh Railroad, Boston, Mass.

Floyd-Jones, Charles,
South Oyster Bay, L. I.

Gzowski, Mr.,
St. Lawrence & Atlantic Railroad, Montreal, Canada.

Gilbert, Wm. B.,
Rutland and Burlington Railroad, Rutland, Vt.

Grant, James H.,
Nashville and Chattanooga R. R., Nashville, Tenn.

Harry, P.,
Binghamton, New York.

Holcomb, F. P.
Southwestern Railroad, Macon, Ga.

Higgins, B.
Mansfield and Sandusky Railroad, Sandusky City, O.

Johnson, Edwin F.
New York and Boston Railroad, Middletown Ct.

Latrobe, B. H.,
Baltimore and Ohio Railroad, Baltimore, Md.

Miller, J. F.,
Worcester and Nashua Railroad, Worcester, Mass.

Morton, A. C.,
Atlantic and St. Lawrence Railroad, Portland, Me.

McRae, John,
South Carolina Railroad, Charleston, S. C.

Nott, Samuel,
Lawrence and Manchester Railroad, Boston,

Reynolds, L. O.,
Central Railroad, Savannah, Ga.

Roberts, Solomon W.,
Ohio and Pennsylvania Railroad, Pittsburgh, Pa.

Robinson, James P.,
Androscggin & Kennebec Railroad, Waterville, Me.

Schlatter, Charles L.,
Northern Railroad (Ogdensburg), Malone, N. Y.

Stark, George.,
Bost., Con. and Mont. R. R., Meredith Bridge, N. H.

Steele, J. Dutton,
Pottstown, Pa.

Trimble, Isaac R.,
Philad., Wil. & Baltimore Railroad, Wilmington, Del.

Tinkham, A. W.,
United States Fort, Bucksport, Me.

Thomson, J. Edgar.,
Pennsylvania (Central) Railroad, Philadelphia.

Whipple, S.,
Civil Engineer and Bridge Builder, Utica, N. Y.

Williams, E. P.,
Auburn and Schenectady Railroad, Auburn, N. Y.

Williams, Charles H.,
Milwaukie, Wisconsin.

BUSINESS CARDS.

Dudley B. Fuller & Co.,
IRON COMMISSION MERCHANTS,
No. 139 GREENWICH STREET,
NEW YORK.

Cruse & Burke,
Civil Engineers, Architects and Surveyors,
Office, New York State Institution of Civil Engineers,
STATE HALL, ALBANY., N. Y.

Drawings, specifications and surveys accurately executed. Pupils instructed theoretically and practically at a moderate premium.
May 26, 1849.

Eaton, Gilbert & Co.,
Railroad Car, Coach and Omnibus Builders,
TROY, N. Y.

Hudson River Foundry,
THOMAS & COLLINS,
130 Quay Street, Albany.

To Railroad & Navigation Cos.

MR. M. BUTT HEWSON, *Civil Engineer*, offers his services to Companies about to carry out the surveys or works of a line of Navigation or Railroad. He can give satisfactory references in New York City as to his professional qualifications; and will therefore merely refer here to the fact of his having been engaged for upwards of two years conducting important Public Works for the British Government.

Communications will find Mr. Hewson at the office of the Railroad Journal, 54 Wall Street, New York.

J. T. Hodge,
Eagle River P. O. Lake Superior.

James Laurie, *Civil Engineer,*
No. 23 RAILROAD EXCHANGE, BOSTON, MASS.

Railroad Routes explored and surveyed. Estimates, Plans and Specifications furnished for Dams, Bridges, Wharves, and all Engineering Structures.
October 14, 1848. 6m*

James Herron, *Civil Engineer,*
OF THE UNITED STATES NAVY YARD,
PENSACOLA, FLORIDA.,
PATENTEE OF THE
HERRON RAILWAY TRACK.

Models of this Track, on the most improved plans, may be seen at the Engineer's office of the New York and Erie Railroad.

To Railroad Companies.
—WROUGHT IRON WHEELS—
SAFETY AND ECONOMY.
NORRIS' LOCOMOTIVE WORKS,
SCHENECTADY, NEW YORK,

Are Manufacturing Wrought Iron Driving, Truck, Tender, and Car Wheels—made from the best American Iron. Address E. S. NORRIS.
May 16, 1849.

Manning & Lee,
GENERAL COMMISSION MERCHANTS,
NO. 51 EXCHANGE PLACE,
BALTIMORE.

Agents for Avalon Railroad Iron and Nail Works. Maryland Mining Company's Cumberland Coal 'CED —'Potomac' and other good brands of Pig Iron.

Samuel Kimber & Co.,
COMMISSION MERCHANTS
WILLOW ST. WHARVES, PHILADELPHIA.

AGENTS for the sale of Charcoal and Anthracite Pig Iron, Hammered Railroad Car and Locomotive Axles, Force Pumps of the most approved construction for Railroad Water Stations and Hydraulic Rams, etc., etc.
July, 27, 1849.

IRON.

Railroad Iron.

THE SUBSCRIBERS ARE PREPARED TO take orders for Railroad Iron to be made at their Phœnix Iron Works, situated on the Schuylkill River, near this city, and at their Safe Harbor Iron Works, situated in Lancaster County, on the Susquehannah river; which two establishments are now turning out upwards of 1800 tons of finished rails per month.

Companies desirous of contracting will be promptly supplied with rails of any required pattern, and of the very best quality.

REEVES, BUCK & CO.,
45 North Water St., Philadelphia.
March 15, 1849.

To the Proprietors of Rolling Mills and Iron Works.

THE Undersigned—Proprietors of Townsend's Furnace and Machine Shop, Albany—are extensively engaged in the manufacture of Machinery and fixtures for Iron, and Copper Rolling Mills, and Iron Works. Having paid particular attention to the manufacture of *Rolls* (Rollers), both *chilled* and *dry-sand*, they feel confident that they can execute orders for such castings in a satisfactory manner. And to give assurance of this, they beg leave to refer to the following named persons, proprietors and managers of some of the most extensive rolling mills in the country, viz: Jno. F. Winslow, J. Tuckerman, H. Burden, W. Burtt, J. & J. Rogers, Saltus & Co., J. B. Bailey, L. G. B. Cannon, Hawkins & Atwater, etc., etc.

FRANKLIN TOWNSEND & CO.
Albany, August 18, 1849,

Railroad Iron.

THE Undersigned offer for sale 3000 Tons Railroad Iron at a fixed price, to be made of any required ordinary section, and of approved stamp.

They are generally prepared to contract for the delivery of Railroad Iron, Pig, Bar and Sheet Iron—or to take orders for the same—all of favorite brands, and on the usual terms. ILLIUS & MAKIN.
41 Broad street.
March 29, 1849. 3m.13

PATENT HAMMERED RAILROAD, SHIP & BOAT SPIKES.—The Albany Iron Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes from 2 to 12 inches in length, and of any form of head From the excellence of the material always used in their manufacture, and their very general use for rail roads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscribers at the works will be promptly executed.

JOHN F. WINSLOW, *Agent.*
Albany Iron and Nail Works, Troy, N. Y.

The above Spikes may be had at factory prices, of Erastus Corning & Co Albany; Merritt & Co., New York; E. Pratt & Brother, Baltimore, Md.

LAP—WELDED
WROUGHT IRON TUBES
FOR
TUBULAR BOILERS,
FROM 1 1-2 TO 8 INCHES DIAMETER.

These are the ONLY Tubes of the same quality and manufacture as those so extensively used in England, Scotland, France and Germany, for Locomotive, Marine and other Steam Engine Boilers

THOMAS PROSSER,
Patentee.
28 Platt street, New York.

Railroad Iron.

THE UNDERSIGNED ARE PREPARED TO contract for the delivery of English Railroad Iron of favorite brands, during the Spring. They also receive orders for the importation of Pig, Bar, Sheet, etc. Iron. THOMAS B. SANDS & CO.,
22 South William street,
February 3, 1849. New York.

Iron Store.

THE Subscribers, having the selling agency of the following named Rolling Mills, viz: Norristown, Rough and Ready, Kensington, Triadelphia, Pottsgrove and Thorndale, can supply Railroad Companies, Merchants and others, at the wholesale mill prices for bars of all sizes, sheets cut to order as large as 58 in. diameter; Railroad Iron, domestic and foreign; Locomotive tire welded to given size; Chairs and Spikes; Iron for shafting, locomotive and general machinery purposes; Cast, Shear, Blister and Spring Steel; Boiler rivets; Copper; Pig iron, etc., etc.

MORRIS, JONES & CO.,
Iron Merchants,
Schuylkill 7th and Market Sts., Philadelphia.
August 16, 1849. 1y33

THE NEW JERSEY IRON CO'S WORKS AT Boonton, are now in full operation, and can execute orders for Railroad Bars of any required pattern, equal in quality to any made in this country. Apply to J. F. MACKIE,
Nos. 85 and 87 Broad St.
New York, June 8, 1849.

Railroad Iron.

OF approved T patterns, weighing 56 to 60 lbs. per lineal yard, made by the best English manufacturers, and under our own specification and inspection.

In store and to arrive. For sale by
DAVIS, BROOKS, & CO.,
68 Broad street.
New York, June 1, 1849. t

☞ The above will favorably compare with any other rails.

Railroad Iron, Pig Iron, &c.

600 Tons of T Rail 60 lbs. per yard.
25 Tons of 2½ by ⅝ Flat Bars.
25 Tons of 2½ by 9-16 Flat Bars.
100 Tons No. 1 Gartsherrie.
100 Tons Welsh Forge Pigs.
For Sale by A. & G. RALSTON & CO.
No. 4 So. Front St., *Philadelphia*

Monument Foundry.

A. & W. DENMEAD & SON,
Corner of North and Monument Sts.,—Baltimore,
HAVING THEIR
IRON FOUNDRY AND MACHINE SHOP
In complete operation, are prepared to execute faithfully and promptly, orders for
Locomotive or Stationary Steam Engines,
Woolen, Cotton, Flour, Rice, Sugar Grist, or Saw Mills,
Slide, Hand or Chuck Lathes,
Machinery for cutting all kinds of Gearing.
Hydraulic, Tobacco and other Presses,
Car and Locomotive patent Ring Wheels, warranted,
Bridge and Mill Castings of every description,
Gas and Water Pipes of all sizes, warranted,
Railroad Wheels with best faggotted axle, furnished and fitted up for use, complete

☞Being provided with Heavy Lathes for Boring and Turning Screws, Cylinders, etc., we can furnish them of any pitch, length or pattern.

☞ Old Machinery Renewed or Repaired—and Estimates for Work in any part of the United States furnished at short notice.
June 8, 1849.

Railroad Iron.

THE TRENTON IRON COMPANY ARE NOW turning out one thousand tons of rails per month, at their works at Trenton, N. J. They are prepared to enter into contract to furnish rails of any pattern, and of the very best quality, made exclusively from the famous Andover iron. The position of the works on the Delaware river, the Delaware and Raritan canal, and the Camden and Amboy railroad, enables them to ship rails at all seasons of the year. Apply to
COOPER & HEWITT, *Agents.*
17 Burling Slip, New York.
October 30, 1848.

American Cast Steel.

THE ADIRONDAC STEEL MANUFACTURING CO. is now producing, from American iron, at their works at Jersey City, N.J., Cast Steel of extraordinary quality, and is prepared to supply orders for the same at prices below that of the imported article of like quality. Consumers will find it to their interest to give this a trial. Orders for all sizes of hammered cast steel, directed as above, will meet with prompt attention.
May 28, 1849.

SPRING STEEL FOR LOCOMOTIVES, TENDERS AND CARS.—The subscriber is engaged in manufacturing spring steel from 1¼ to 6 inches in width, and of any thickness required: large quantities are yearly furnished for railroad purposes, and wherever used its quality has been approved of. The establishment being large, can execute orders with great promptitude, at reasonable prices, and the quality warranted. Address J. F. WINSLOW, *Agent,*
Albany Iron and Nail Works.

Pig and Bloom Iron.

THE Subscribers are Agents for the sale of numerous brands of Charcoal and Anthracite Pig Iron, suitable for Machinery, Railroad Wheels, Chains, Hollowware, etc. Also several brands of the best Puddling Iron, Juniata Blooms suitable for Wire, Boiler Plate, Axe Iron, Shovels, etc. The attention of those engaged in the manufacture of Iron is solicited by
A. WRIGHT & NEPHEW,
Vine Street Wharf, Philadelphia.

Railroad Iron.

RAILROAD IRON & LOCOMOTIVE TIRES imported to order, and constantly on hand, by
A. & G. RALSTON,
4 South Front St., Philadelphia.

Railroad Iron.

THE MOUNT SAVAGE IRON WORKS, Alleghany county, Maryland, having recently passed into the hands of new proprietors, are now prepared, with increased facilities, to execute orders for any of the various patterns of Railroad Iron. Communications addressed to either of the subscribers will have prompt attention. J. F. WINSLOW, *President*
Troy, N.Y.
ERASTUS CORNING, Albany.
WARREN DELANO, Jr., N.Y.
JOHN M. FORBES, Boston.
ENOCH PRATT, Baltimore, Md.
November 6, 1848.

WILLIAM JESSOP & SONS'
CELEBRATED CAST-STEEL.

The subscribers have on hand, and are constantly receiving from their manufactory,
PARK WORKS, SHEFFIELD,
Double Refined Cast Steel—square, flat and octagon.
Best warranted Cast Steel—square, flat and octagon.
Best double and single Shear Steel—warranted.
Machinery Steel—round.
Best and 2d gy. Sheet Steel—for saws and other purposes.
German Steel—flat and square, "W. I. & S." "Eagle" and "Goat" stamps.
Genuine "Sykes," L Blister Steel.
Best English Blister Steel, etc., etc., etc.
All of which are offered for sale on the most favorable terms by WM. JESSOP & SONS,
91 John street, New York.
Also by their Agents—
Curtus & Hand, 47 Commerce street, Philadelphia.
Alex'r Fullerton & Co., 119 Milk street, Boston.
Stickney & Beatty, South Charles street, Baltimore.
May 6, 1848.

Railroad Iron.

100 Tons 2½ x ½, | 30 Tons Railroad.
All fit to re-lay. For sale cheap by
PETTEE & MANN,
228 South St., New York.
May 16, 1849.

MANUFACTURE OF PATENT WIRE ROPE and Cables for Inclined Planes, Standing Ship Rigging, Mines, Cranes, Tillers, etc, by
JOHN A. ROEBLING, *Civil Engineer,*
Pittsburgh, Pa.
These *Ropes* are now in successful operation on the planes of the Portage railroad in Pennsylvania, on the Public Slips, on Ferries, and in Mines. The first rope put upon Plane No. 3, Portage railroad, has now run four seasons, and is still in good condition.

Iron.

THE SUBSCRIBERS having resumed the agency of the New-Jersey Iron Company, are prepared to execute orders for the different kinds and sizes of Iron usually made at the works of the company, and offer for sale on advantageous terms.—
150 tons No. 1 Boonton Foundry Pig Iron.
100 " No. 2 do. do.
300 " Nos. 2 & 3 Forge do. do.
100 " No. 2 Glendon do. do.
140 " Nos. 2 & 3 Lehigh Crane do do.
100 " No. 1 Pompton Charcoal do.
100 " New-Jersey Blooms
50 " New-Jersey Faggoting Iron, for shafts
Best Bars, ¼ to 4 inch by ¼ to 1 inch thick.
Do do Rounds and Squares, ⅝ to 3 inch.
Rounds and Squares, 3-16 to 1 inch.
Half Rounds, ½ to 1 in. Ovals & Half Ovals ½ to 1½ in.
Bands, 1½ to 4 inch. Hoops, ⅝ to 2 inch.
Trunk Hoops, ½ to 1½ in. Horse Shoe & Nut Iron.
DUDLEY B. FULLER & Co., 139 Greenwich-st. and 85 Broad-st.

American Pig, Bloom and Boiler Iron.

HENRY THOMPSON & SON,
No 57 South Gay St., Baltimore, Md.,
Offer for sale, *Hot Blast* Charcoal *Pig Iron* made at the *Catoctin* (Maryland), and *Taylor* (Virginia), *Furnaces; Cold Blast* Charcoal Pig Iron from the *Cloverdale* and *Catawba*, Va., Furnaces, suitable for *Wheels* or *Machinery* requiring *extra* strength; also *Boiler* and *Flue Iron* from the mills of Edge & Hilles in Delaware, and *best quality Boiler Blooms* made from *Cold Blast Pig Iron* at the *Shenandoah Works*, Va. The productions of the above establishments can always be had at the lowest market prices for approved paper.
American Pig Iron of other brands, and *Rolled* and *Hammered Bar Iron* furnished at lowest prices. Agents for *Watson's Perth Amboy Fire Bricks*, and Rich & Cos. New York Salamander Iron Chests.
Baltimore, June 14, 1849. 6 mos

Iron Wire.

REFINED IRON WIRE OF ALL KINDS, Card, Reed, Cotton-flyer, Annealed, Broom, Buckle, and Spring Wire. Also all kinds of Round, Flat or Oval Wire, best adapted to various machine purposes, annealed and tempered, straightened and cut any length, manufactured and sold by
ICHABOD WASHBURN.
Worcester, Mass., May 25, 1849.

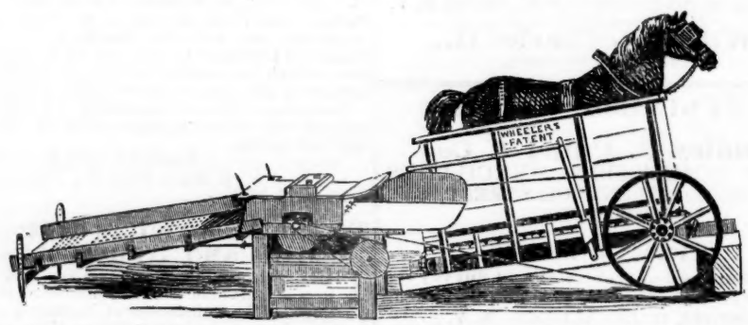
American and Foreign Iron.
FOR SALE,

300 Tons A 1, Iron Dale Foundry Iron.
100 " 1, " " "
100 " 2, " " "
100 " " Forge "
400 " Wilkesbarre " "
100 " "Roaring Run" Foundry Iron.
300 " Fort " "
50 " Catoctin " "
250 " Chikiswalungo " "
50 " "Columbia" "chilling" iron, a very superior article for car wheels.
75 " "Columbia" refined boiler blooms.
30 " 1 x ¼ Slit iron.
50 " Best Penna. boiler iron.
50 " "Puddled" "
50 " Bagnall & Sons refined bar iron.
50 " Common bar iron.
Locomotive and other boiler iron furnished to order.
GOODHUE & CO.,
64 South street
New York.

Roman Cement,

OF the best quality, now landing from ship Hendrick Hudson, from London, made by Billingsley, Mial & Co., and superior to anything of the kind manufactured in England. For sale by G. T. SNOW,
109 Water Street, New York.

Railroad Horse Power and Saw Mill.



The above cut represents the most simply constructed Endless Railway Power in use. As shown it is attached to a threshing machine, with which it is most extensively used; but for sawing wood at railroad stations it has no superior. The saw mill which accompanies it is simple, cheap and convenient. The single power by the weight of the horse at the elevation of one and a half inches to the foot—the horse weighing eleven hundred pounds—is capable, with the attention of at most three men, of sawing twice in two from 12 to 20 cords of four foot wood per day. They have been used several years on several roads in New England, and for manufacturing establishments more than three thousand of these powers are in use, and without exception have given universal satisfaction. Their principal advantage is, their great simplicity: the full speed being obtained with simple rack and pinion, without intermediate gearing. They are warranted to give satisfaction as above described, or may be returned at my expense, and the purchase money refunded.
HORACE L. EMERY,
September 6, 1849. Nos. 469 & 371 Broadway, Albany, N. Y.

Iron Safes.

FIRE and Thief-proof Iron Safes, for Merchants, Banks and Jewelers use. The subscriber manufactures and has constantly on hand, a large assortment of Iron Safes, of the most approved construction, which he offers at much lower rates than any other manufacturer. These Safes are made of the strongest materials, in the best manner, and warranted entirely fire proof and free from dampness. Western merchants and the public generally are invited to call and examine them at the store of E. Corning & Co., sole agents, John Townsend, Esq., or at the manufactory.



Each safe furnished with a thief-detector lock, of the best construction.

Other makers' Safes repaired, and new Keys and Locks furnished at the shortest notice.

H. W. COVERT,
cor. Steuben and Water sts. Albany.
August 24, 1848.

TO RAILROAD COMPANIES AND MANUfacturers of Railroad Machinery. The subscribers have for sale American and English Bar Iron, of all sizes; English Blister, Cast, Shear and Spring Steel; Juniata Rods; Car Axles, made of double refined iron; Sheet and Boiler Iron, cut to pattern; Tires for Locomotive Engines, and other railroad carriage wheels, made from common and double refined B. O. Iron; the latter a very superior article. The Tires are made by Messrs. Baldwin and Whitney, Locomotive Engine Manufacturers of this city. Orders addressed to them, or to us, will be promptly executed.

When the exact diameter of the wheel is stated in the order, a fit to those wheels is guaranteed, saving to the purchaser the expense of turning them out inside.

THOMAS & EDMUND GEORGE,
a45 N. E. cor. 12th and Market sts., Philad., Pa.

To Railroad Companies and Contractors.

FOR SALE.—Two Locomotive Engines and Tenders, at present in use on the Beaver Meadow Railroad, being too light for their coal trains, but well calculated for either gravel or light passenger trains.

They weigh, in running order, about 8 tons each—having one pair of driving wheels 4 feet diameter, 4 truck wheels 30 inches diameter, with cylinders 10 in. diameter, and 18 inches stroke of piston. Tenders on 4 wheels. Address JAMES ROWLAND,
Prest. Beaver Meadow Railroad & Coal Co., Philadelphia.
or, L. CHAMBERLAIN, Sec'y, at Beaver Meadow, Pa.
May 19, 1849. 20tf

India-rubber for Railroad Cos.

RUBBER SPRINGS—*Bearing and Buffer—Fuller's Patent—Hose* from 1 to 12 inches diameter. Suction Hose. *Steam Packing*—from 1-16 to 2 in. thick. *Rubber and Gutta Percha Bands.* These articles are all warranted to give satisfaction, made under Tyer & Helm's patent, issued January, 1849.—No lead used in the composition. Will stand much higher heat than that called "Goodyear's," and is in all respects better than any in use. Proprietors of railroads do not be overcharged by pretenders.

HORACE H. DAY,
Warehouse 23 Courtlandt street.
New York, May 21, 1849.

NICOLL'S PATENT SAFETY SWITCH FOR Railroad Turnouts. This invention for some time in successful operation on one of the principal railroads in the country, effectually prevents engines and their trains from running off the track at a switch, left wrong by accident or design. It acts independently of the main track rails; being laid down or removed without cutting or displacing them.

It is never touched by passing trains, except when in use, preventing their running off the track. It is simple in its construction and operation, requiring only two castings and two rails; the latter, even if much worn or used, not objectionable.

Working models of the Safety Switch may be seen at Messrs. Davenport, Bridges & Kirk's Cambridge Port, Mass., and at the office of the Railroad Journal, New York.

Plans, Specifications, and all information obtained, on application to the Subscriber, Inventor and Patentee.

G. A. NICOLLS,
Reading, Pa.

Large Pumps.

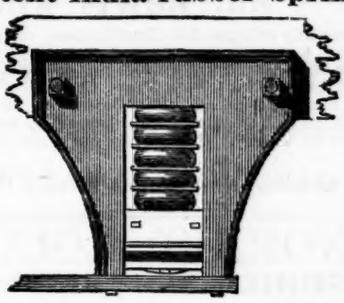
THE Boston Water Commissioners offer for sale a large number and variety of Wooden Square Pumps, used in clearing excavations from water during the construction of the Aqueducts.

Also Two Large Screw Pumps, each 25 feet long and 2½ feet in diameter.

For further particulars, enquire at the office of the Water Commissioners, 119 Washington St., Boston, or of E. S. Chesbrough, West Newton.

May 19, 1849. 6w20

Patent India-rubber Springs.



FULLER & CO. beg that parties interested in the use of these Springs will not be misled by exparte statements, but will examine the actual Patents and judge for themselves.

The statements made by Messrs. Crane & Ray shall be treated seriatim.

They claim to have first introduced India-rubber Springs about two years since, whereas they were used by Fuller & Co. nearly four yeas ago.

They claim the exclusive right to use Sprngs. They have no right whatever; every spring they make is an infringement upon Fuller's patent, dated 1845. They claim the sole right to make India rubber, and apparently think because a species of India-rubber was patented some years since, that no person can make any other now. A patent was *granted in January last* to Messrs. Tyer & Helm for a new and improved kind of Vulcanized rubber which is used by Fuller & Co.

Fuller's springs it is needless to say are in very general use, although Messrs. Crane & Ray pretend that they know of only one or two instances. Fuller & Co. guarantee all parties who use their springs.

As to the Legal proceedings—an action has been commenced against one company for an alleged infringement of Goodyear's patent, but is being defended with every prospect of success. An action has also been commenced by Fuller & Co., against parties for an infringement of Fuller's patent, and *this will be done in every case of violation.*

In every case in which Fuller's spring has been applied, it has been pronounced superior to that made by Mr. Ray, and this fact induces Messrs. Crane & Ray to claim the right of using it. They attempt to lead the public from the real question at issue, by producing a Deposition as to Mr. Ray having *tried to make* a spring which Mr. Fuller *did make* and patent. If Mr. Ray did invent a spring in 1844, why did he not apply for a patent, and not wait until 1848, when his application was rejected!

Mr. Knevitt has never stated that the springs were put on by him, which are refered to in Mr. Hale's article, but he does state that those springs are made according to Mr. Fuller's specification, and consequently are an infringement upon it. The article of Mr. Hale in the Boston Advertiser, quoted by Messrs Crane & Ray, was followed immediately by a letter in the same paper, from Mr. Knevitt, setting forth the facts of the case.

The springs refered to were put on by Mr. Ray before Mr. Knevitt came to the United States; when he arrived he gave Mr. Ray notice not to proceed further in making or vending such springs; Mr. Ray then said he did not wish to infringe, and would not continue to do so, and he then contrived an India-rubber and Air spring which totally failed.

In the selection of their first agent, Fuller & Co. were particularly unfortunate, and their reason for adverting to it is simply that it may tend to throw light on subsequent transactions, and furnish a reply to the remark, "that this opposition was invited by their own delay in getting the thing to work." The individual refered to undertook the agency for Fuller's springs, and left Liverpool on the 1st January, 1847, furnished with a complete set of drawings, models, etc., and every necessary instruction to make arrangements respecting the supply of material, and to have it at work within the time limited by law; but *from that hour to the present, not a single communication has been received from the said agent.* Some of their models, however, they have traced into the hands of parties now seeking to invade their rights, and by whom they understand they have been exhibited as specimens of their own invention.

The superiority of Fuller's spring is implied in the offer of the New England Car Co. to make springs upon his principle (now that a preference is given to the disc and plate form) and this notwithstanding the fact, that Fuller & Co. have a patent, and that Mr. Ray's application for one was rejected. The public can judge which company's course has been the most honorable, or whose statements are entitled to consideration.

Fuller's springs can be obtained of *Mr. Knevitt* the Agent, at 38 Broadway New York, and of *Messrs James Lee & Co.*, 18 India Wharf, Boston.

May 26, 1849.

C. W. Bentley & Co,

IRON Founders, Portable Steam Engine Builders and Boiler Makers, Corner Front and Plowman Sts., near Balttmore St. Bridge,

BALTIMORE, MARYLAND.

Their Engines are simple in their construction, compact and durable; they require no brick work in setting them, and occupyidg but a small space (a six horse power engine and boiler, standing on a cast iron plate of three by six feet.)

They also manufacture Major W. P. Williamson's new oscillating Engine; a superior article, combining cheapness and simplicity (one of which may be seen in operation at their shop.) Both of these engines are adapted to any purpose where power is required, and may be made of any capacity; and for economy in use of fuel are unsurpassed.

All kinds of machinery made to order. Steam Generators, Force Pumps, Wrought Iron Pipes and Fillings for Steam, Water, Gas, etc., constantly on hand,

Baltimore, June 6, 1849.

PHILADELPHIA CAR MANUFACTORY,

CORNER SCHUYLKILL 2D AND HAMILTON STS.,

SPRING GARDEN, PHILADELPHIA CO., PA.

Kimball & Gorton,

Having recently constructed the above works, are prepared to construct at short notice all kinds of

RAILROAD CARS, Viz:

Passenger Cars of all classes—Open and Covered Freight and Express Cars—Coal Cars—Hand Cars & Trucks of all descriptions.

They are also prepared to furnish Chilled Wheels of any pattern. Car Wheels & Axles fitted and furnished. Snow Ploughs and Tenders made to order. Steel and other Springs always on hand.

All orders will be filled at short notice, and upon as good terms as at any other establishment in the country.

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Philadelphia, June 16, 1849. 1y25

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For sale in lots to suit purchasers, in tight papered barrels, by JOHN W. LAWRENCE,
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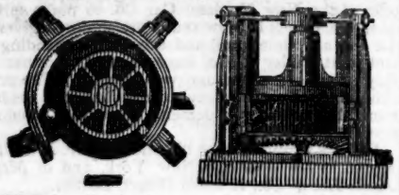
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CHILLED RAILROAD WHEELS.—THE UNdersigned, the *Original Inventor* of the *Plate Wheel* with solid hub, is prepared to execute all orders for the same, promptly and faithfully, and solicits a share of the patronage for those kind of wheels which are now so much preferred, and which he originally produced after a large expenditure of time and money.

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DAVENPORT & BRIDGES,

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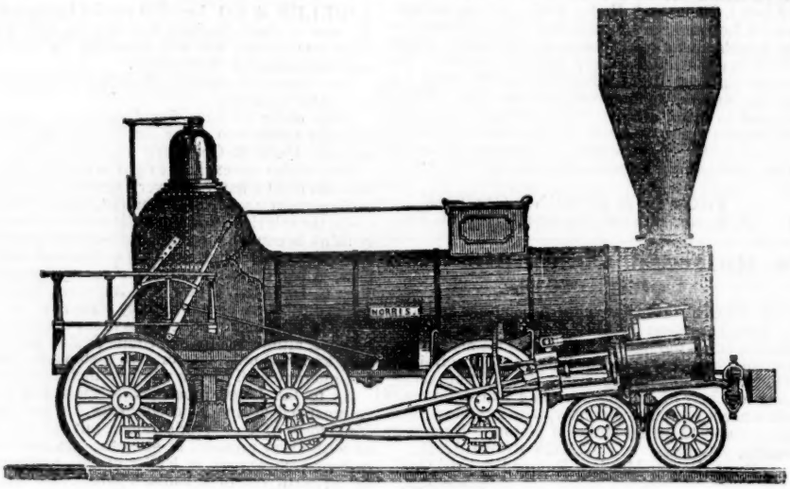
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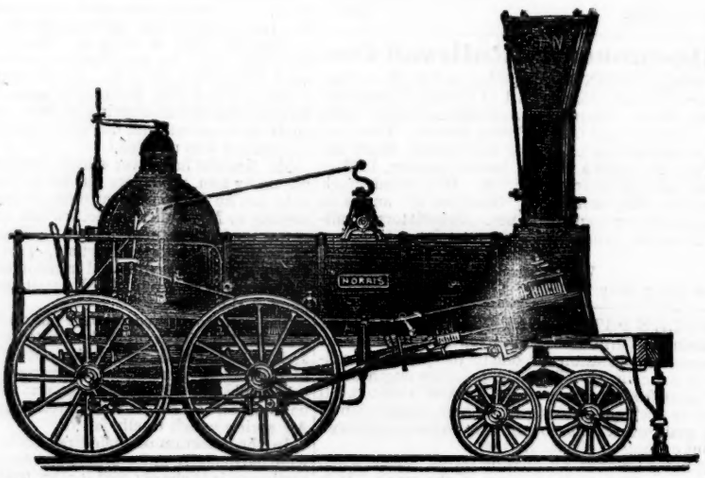
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